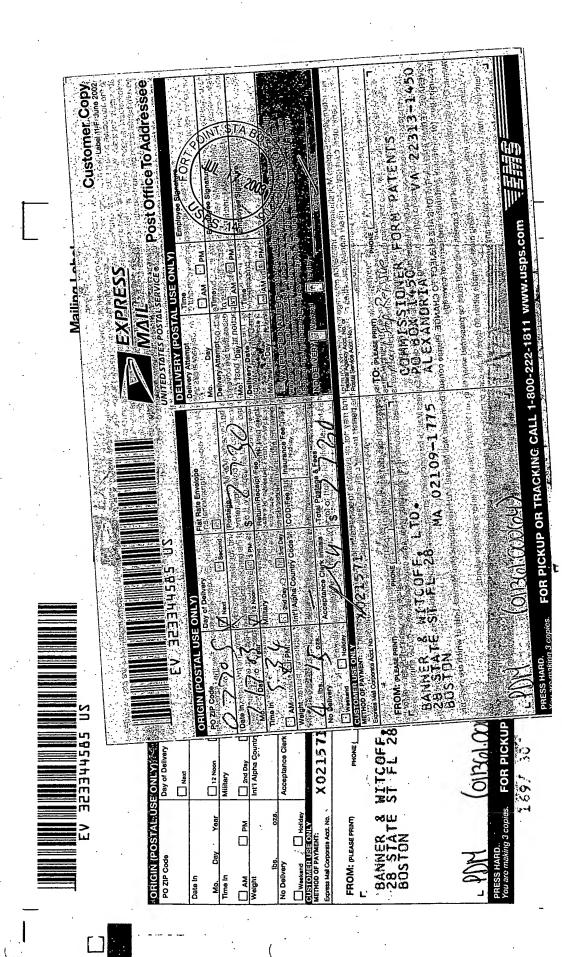
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee:

Shen et al.

Assignee:

Atwood Mobile Products, Inc.

U.S. Patent No.:

5,573,648

Date Issued: November 12, 1996

Application No.:

381,718

Date Filed:

January 31, 1995

Title:

GAS SENSOR BASED ON PROTONIC CONDUCTIVE

MEMBRANES

Mail Stop Reissue Commissioner for Patents P.O. Box. 1450 Alexandria, VA 22313-1450

CERTIFICATE OF EXPRESS MAIL

Dear Sir:

Express Mail Label No.: EV323344585US

Date of Deposit: 1

I hereby state that the following:

- (i) Return Receipt Postcard;
- (ii) Reissue Application Transmittal Letter (2 pages);
- (iii) Reissue Application Fee Transmittal Form (1 page in Duplicate);
- (iv) Power of Attorney or Authorization of Agent Form (2 pages);
- (v) Reissue Application Declaration by the Assignee (8 pages);
- (vi) Chart Showing Differences in Claim Language between the Original Patent Claims and the Presented Reissue Claims (395 pages);
- (vii) Reissue Application Consent of the Assignee (1 page);
- (viii) Certificate Under 37 C.F.R. § 3.73(b) (11 pages);
- (ix) Preliminary Amendment (25 pages);
- (x) Copy of Specification, Figures and Claims of U.S. Patent No. 5,573,648 (18 pages);
- (xi) Statement Under 37 C.F.R. § 1.178(b) (2 pages); and
- (xii) This Certificate of Express Mail (2 pages)

Certificate of Express Mail for Reissue Application of U.S. Patent No. 5,573,648 Page 1 of 2 are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10, on the date indicated above and is addressed to Mail Stop Reissue, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Rachelle Chery

Signature of person mailing paper or fee

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee:

Shen et al.

Assignee:

Atwood Mobile Products, Inc.

U.S. Patent No.:

5,573,648

Date Issued: November 12, 1996

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January 31, 1995

Title:

GAS SENSOR BASED ON PROTONIC CONDUCTIVE

MEMBRANES

Mail Stop Reissue Commissioner for Patents P.O. Box. 1450 Alexandria, VA 22313-1450

TRANSMITTAL LETTER FOR REISSUE APPLICATION OF U.S. PATENT No. 5,573,648

Dear Sir:

Enclosed for filing please find the following reissue application papers for the above referenced patent:

- (i) Return Receipt Postcard;
- (ii) Reissue Application Fee Transmittal Form;
- (iii) Power of Attorney or Authorization of Agent Form;
- (iv) Reissue Application Declaration by the Assignee;
- (v) Chart Showing Differences in Claim Language between the Original Patent Claims and the Presented Reissue Claims;
- (vi) Reissue Application Consent of the Assignee;
- (vii) Certificate Under 37 C.F.R. § 3.73(b);
- (viii) Preliminary Amendment;
- (ix) Copy of Specification, Figures and Claims of U.S. Patent No. 5,573,648;

- (x) Statement Under 37 C.F.R. § 1.178(b); and
- (xi) Certificate of Express Mail.

The Commissioner is hereby authorized to charge all fees or credit overpayments to Deposit Account No. 19-0733.

Respectfully submitted, Shen et al.

Date: 17 July 2003

Peter D. McDermott (Reg. No. 29,411)

Attorney for Applicants

BANNER & WITCOFF, LTD.

28 State Street, 28th Floor

Boston, MA 02109 Phone: (617) 720-9600

Fax: (617) 720-9601

PTO/SB/56 (08-00)

Approved for use through 12/30/2000, OMB 0651-0033

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. Docket Number (Optional) REISSUE APPLICATION FEE TRANSMITTAL FORM 011361.00064 Claims as Filed - Part 1 Claims in Small Entity Other than a Small Entity Number Filed in (3)Patent Reissue Application Rate Number Extra Fee Rate Total Claims (A) 78 (B) 88 10 = (37 CFR 1.16(j)) x \$18 =180 or (C) (D) Independent claims (37 CFR 1.16(i)) x\$84 = 420 Basic Fee (37 CFR 1.16(h)) \$_ 750 Total Filing Fee \$ \$ 1,350 OR Claims as Amended - Part 2 (1) (2)(3) Small Entity Other than a Small Entity Highest Number Claims Remaining Extra Rate Fee After Amendment Previously Claims Rate Fee Paid For Present **Total Claims** MINUS (37 CFR 1.16(i) Independent MINUS Claims (37 CFR 1.16(i)) **Total Additional Fee** \$ OR \$ * If the entry in (D) is less than the entry in (C), Write "0" in column 3. ** If the "Highest Number of Total Claims Previously Paid For" is less than 20, Write "20" in this space. *** After any cancellation of claims. **** If "A" is greater than 20, use (B - A); if "A" is 20 or less, use (B - 20). ***** "Highest Number of Independent Claims Previously Paid For" or Number of Independent Claims in Patent (C). Applicant claims small entity status. See 37 CFR 1.27. Please charge Deposit Account No. in the amount of A duplicate copy of this sheet is enclosed. The Commissioner is hereby authorized to charge any additional fees under 37 CFR 1.16 or 1.17 which may be required, or credit any overpayment to Deposit Account No. 19-0733 A duplicate copy of this sheet is enclosed. A check in the amount of \$ to cover the filing / additional fee is enclosed. Payment by credit card. Form PTO-2038 is attached. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. 17 July 2003 Signature of Applicant, Attorney or Agent of Record Peter D. McDermott (Reg. No. 29,41

Typed or printed name

PTO/SB/56 (08-00)
Approved for use through 12/30/2000. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it did

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Patent	T-4-101-1-	Reissue	Application	Nur	mber Extra	Rate	Fee		Rate	Fee
(A) 78	Total Claims (37 CFR 1.16(j))	(B)	88	***	10 =	x \$=		or	x\$ <u>18</u> =	180
(C) 4	Independent claims (37 CFR 1.16(i))	(D)	9	*	5 =	x \$=) °	x \$ <u>84</u> =	420
				Basi	c Fee (37 C	FR 1.16(h))	\$			\$ <u>75</u> 0
				T	otal Filing F	ee	\$		OR	\$ 1,350
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PTO/SB/81 (05-03) Approved for use through 11/30/2005. OMB 0651-0035 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY OR AUTHORIZATION OF AGENT

Application Number	Reissue of US 5,573,648			
Filing Date	Herewith			
First Named Inventor	Yousheng Shen			
Title	See Attachment 1			
Art Unit	TBA			
Examiner Name	TBA			
Attorney Docket Number	011361.00064			

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Individual Name Address Address City Country Telephone I am the: Applicant/Inventor. X Assignee of record of the entire interestatement under 37 CFR 3.73(b) is Name David Bovee Vice	enclosed. (Form PTO/SB/96). SIGNATURE of Applicant or Ass	Fax gnee of R		
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Individual Name Address Address City Country Telephone I am the: Applicant/Inventor. X Assignee of record of the entire interestatement under 37 CFR 3.73(b) is Name David Bovee. Vices Signature	enclosed. (Form PTO/SB/96). SIGNATURE of Applicant or Ass President, Dura Autor of record of the entire interest or their re	gnee of R	Systems, In	C.

This collection of information is required by 37 CFR 1.31 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Addendum

Attachment 1

Gas Sensor Based on Protonic Conductive Membranes

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee:

Shen et al.

Assignee:

Atwood Mobile Products, Inc.

U.S. Patent No.:

5,573,648

Date Issued: November 12, 1996

Application No.:

381,718

Date Filed:

January 31, 1995

Title:

GAS SENSOR BASED ON PROTONIC CONDUCTIVE

MEMBRANES

Mail Stop Reissue Commissioner for Patents P.O. Box. 1450 Alexandria, VA 22313-1450

REISSUE APPLICATION DECLARATION BY THE ASSIGNEE

Dear Sir:

- I, David Bovee, hereby declare that:
- 1. Dura Automotive Systems, Inc. is authorized to act on behalf of Atwood Mobile Products, Inc. Atwood Industries, Inc. made a capital contribution of all its assets to Atwood RV Products, Inc. Atwood RV Products, Inc. merged with two other companies and subsequently changed its name to Atwood Mobile Products, Inc. I am authorized to act on behalf of Dura Automotive Systems and the title of my position with Dura Automotive Systems, Inc. is Vice President.
- 2. This declaration is being filed to complete the requirements for filing a reissue application for the above-referenced patent. I understand that the assignee of entire interest is authorized to make this declaration for reissue application under 37

C.F.R. § 1.172(a) because the reissue application is not seeking to enlarge the scope of the claims.

- 3. I believe the inventors to be the original and first inventors of the subject matter that is described and claimed in the above-referenced patent, for which a reissue patent is sought on the invention referenced above.
- 4. A copy of the specification, figures, abstract and claims of U.S. Patent No. 5,573,648 is attached hereto.
- 5. I have reviewed and understand the contents of the specification, figures, abstract and claims of the above-referenced patent and the claims presented in the preliminary amendment filed with this declaration.
- 6. A chart showing the differences in claim language between the original patent claims and claims 79-88 presented in the reissue application is attached to this declaration. Because presented reissue claims 1-78 are exactly the same as original patent claims 1-78, respectively, these claims have been omitted from the chart.
- 7. I acknowledge my duty to disclose information that is material to patentability as defined in 37 C.F.R. § 1.56.
- 8. I verily believe the original patent to be wholly or partly inoperative or invalid by reason of the patentee claiming less than he had the right to claim in the patent.

In particular, patentee failed to claim a two-electrode electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising: a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with

the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising: a porous mixed ionic-electronic conductive sensing electrode having both an electronic conductive counter and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim a two-electrode electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising: a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting

material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a porous mixed ionic-electronic conductive

sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane and the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane and the sensing electrode reacting with the gas in the absence of an applied voltage to the sensing electrode.; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects

changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim an electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising: a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas in the absence of an applied voltage to the sensing electrode; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode; means

for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising a porous mixed ionicelectronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm; the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode, in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane; means for electrical measurement; said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage. Such error arose without any deceptive intention on the part of the patentee.

Patentee also failed to claim non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material; a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material; a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm; the sensing electrode reacting with the gas to produce a change in an

electrical characteristic between the sensing electrode and the counter electrode, in which the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode; means for electrical measurement; said sensing and

counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm,

and being electrically connected to said electrical measurement means; whereby, in a

positive ambient concentration of said gas, said electrical measurement means detects

changes in said electrical characteristic in the absence of any biasing voltage. Such error

arose without any deceptive intention on the part of the patentee.

9. All errors corrected in the reissue application arose without deceptive intention

on the part of the Applicant.

10. All statements made herein of my own knowledge are true and that all

statements made on information and belief are believed to be true; and further that these

statements were made with the knowledge that willful false statements and the like so

made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that

such willful false statements may jeopardize the validity of the application or any patent

issued thereon.

7 July 2003

Dated

David Bovee

Vice President, Dura Automotive Systems, Inc.

uage	reissue claim 79 recites the language "a two-electrode he language "the sensing electrode and the counter electrode e first protonic conductive electrolyte membrane."	recites the language "a two-electrode nsing electrode and the counter electrode active electrolyte membrane."	t recite the language "means for applying electrical connection between the sensing C power across the protonic conductive I connection between the sensing electrode e means for applying DC power across the nsported away from the counter electrode uctive electrolyte membrane applies a DC	recites the language "a two-electrode insing electrode and the counter electrode uctive electrolyte membrane."	recite the language "wherein said sensing	recites the language "a two-electrode assing electrode and the counter electrode active electrolyte membrane."	recite the language "wherein said sensing
Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 79 does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC	Unlike original patent claim 3, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 3, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 4, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	6.2	6/		79		79	
Original Patent Claim		2		3		4	

guage	recites the language "a two-electrode the sensing electrode and the counter e first protonic conductive electrolyte	ites the language "wherein said sensing	recites the language "a two-electrode the sensing electrode and the counter e first protonic conductive electrolyte	es not recite the language "wherein the mprised of a solid, perfluorinated, ion-
Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 79 recites the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	79		79	
Original Patent Claim	\$		9	

ınguage	recites the language "a two-electrode" the sensing electrode and the counter the first protonic conductive electrolyte	oes not recite the language "wherein the oxide protonic conductor electrolyte	recites the language "a two-electrode "the sensing electrode and the counter he first protonic conductive electrolyte	oes not recite the language "wherein the
Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	79	·	79	
Original Patent Claim	7		∞	

guage	recites the language "a two-electrode the sensing electrode and the counter e first protonic conductive electrolyte	es not recite the language "wherein the	recites the language "a two-electrode the sensing electrode and the counter e first protonic conductive electrolyte	79 recites the language "wherein the
Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 9, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 79 recites the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	79		79	
Original Patent Claim	6		10	

ıguage	recites the language "a two-electrode" the sensing electrode and the counter le first protonic conductive electrolyte	ses not recite the language "wherein the	recites the language "a two-electrode the sensing electrode and the counter e first protonic conductive electrolyte	ses not recite the language "wherein the
Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 11, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	79		79	
Original Patent Claim	11		12	

uage	ecites the language "a two-electrode ne sensing electrode and the counter first protonic conductive electrolyte	s not recite the language "wherein the 0 mm, and the protonic conductive	ecites the language "a two-electrode ne sensing electrode and the counter first protonic conductive electrolyte	s not recite the language "wherein the ounter electrodes are a proton-electron ictor material and 50-90 wt% of a first
Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 13, presented reissue claim 79 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 14, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	6/	-	79	
Original Patent Claim	13		14	

ınguage	9 recites the language "a two-electrode "the sensing electrode and the counter he first protonic conductive electrolyte	loes not recite the language "wherein the ter electrodes is a copolymer having a ed monomers containing at least one of a	9 recites the language "a two-electrode "the sensing electrode and the counter he first protonic conductive electrolyte	oes not recite the language "wherein one sensing electrode is 50-99 wt% of carbon stor materials for the sensing electrode is
Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	79		79	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 17, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 18, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	79		79	
Original Patent Claim	17		18	

аде	cites the language "a two-electrode sensing electrode and the counter irst protonic conductive electrolyte	not recite the language "wherein the cond pumping electrodes comprise	cites the language "a two-electrode sensing electrode and the counter irst protonic conductive electrolyte	not recite the language "wherein the pumping electrodes comprise noble
Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 19, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 20, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	6/		79	
Original Patent Claim	19		20	

Differences in the Claim Language		Unlike original patent claim 21, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 79 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	79		79	
Original	Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	79		79	
Original Patent Claim	23		24	

im Language	ginal patent claim 25, presented reissue claim 79 recites the language "a two-electrode nical gas sensor" and also recites the language "the sensing electrode and the counter being the only two electrodes in contact with the first protonic conductive electrolyte".	inal patent claim 25, presented reissue claim 79 does not recite the language "wherein one and second electrical conductor materials for the first pumping electrode is 50-99 wt% of k, and the other of the first and second electrical conductor materials for the first pumping is 10 to 50 wt% of platinum."	ginal patent claim 26, presented reissue claim 79 recites the language "a two-electrode nical gas sensor" and also recites the language "the sensing electrode and the counter being the only two electrodes in contact with the first protonic conductive electrolyte".	and second electrical conductor materials for the second pumping electrode is 50-99 wt% black, and the other of the first and second electrical conductor materials for the second lectrode is 10 to 50 wt% of Ru oxide."
Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	79		79	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 27, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 28, presented reissue claim 79 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	79		79
Original Patent Claim	27		28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 29, presented reissue claim 79 does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 79 does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means for applying a DC pulse power source across the membrane; when said switch means for applying a DC pulse power source across the membrane electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the means connects said means for applying a DC pulse power source across the means connects said means for applying a DC pulse power source across the means counter electrodes."
Presented Reissue Claim	79		79
Original Patent Claim	29		30

al Presented Differences in the Claim Language	laim Reissue Claim	Unlike original patent claim 31, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 31, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 79 does not recite the language "wherein said
Original P	Patent Claim Rei	31		32

Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	,		
Original Patent Claim	33		34

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 35, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	79	79
Original Patent Claim	35	36

guage	recites the language "a two-electrode onic conductive electrolyte membrane les, and having a thickness in the range le counter electrode being the only two olyte membrane" and also recites the ameter in the range of approximately 1 al measurement means."	loes not recite the language "rein the	recites the language "a two-electrode onic conductive electrolyte membrane es, and having a thickness in the range e counter electrode being the only two olyte membrane" and also recites the ameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	79		79
Original Patent Claim	37		

guage	recites the language "a two-electrode lonic conductive electrolyte membrane les, and having a thickness in the range ne counter electrode being the only two rolyte membrane" and also recites the ameter in the range of approximately 1 al measurement means."	es not recite the language "wherein the	recites the language "a two-electrode conic conductive electrolyte membrane les, and having a thickness in the range re counter electrode being the only two rolyte membrane" and also recites the ameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 39, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	79		79
Original Patent Claim	36		40

guage	recites the language "a two-electrode the sensing electrode and the counter first protonic conductive electrolyte	recites the language "a two-electrode the sensing electrode and the counter first protonic conductive electrolyte	es not recite the language "wherein the 10 mm, and the protonic conductive
Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," and also recites the language the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	U Unlike original patent claim 42, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," and also recites the language the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 40, presented reissue claim 79 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	79	79	
Original Patent Claim	41	42	•

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 43, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 44, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	79		79	
Original Patent Claim	43		44	

nted Differences in the Claim Language Claim	Unlike original patent claim 45, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 45, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 46, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	79		79	į
Original Patent Claim	45		46	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
47	79	Unlike original patent claim 47, presented reissue claim 79 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 47, presented reissue claim 79 does not recite the language "a second
		protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive
		pump electrodes, each having both an electronic conductive material and an ionic conducting
		material, each of said first and second pump electrodes being separate from said sensing and counter
		electrodes and situated on opposite sides of and in contact with said second protonic conductive
		electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from
		the ambient atmosphere; said second porous pump electrode being separated from said counter
		electrode by a perforated support structure composed of an electrical conducting material, both said
		second porous pump electrode and said counter electrode being in contact with said perforated
		support structure; means for electrical measurement in electrical contact with said sensing electrode
		and perforated support structure; means for applying a DC power across said second protonic
		electrolyte membrane in electrical contact with said first pump electrode and said perforated support
	·	structure; whereby the gas is transported away from the counter electrode when the means for
		applying a DC power across said second protonic electrolyte membrane applies a DC power across
·		said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said
		gas, said electrical measurement means detects changes in said electrical characteristic"

	·	
guage	recites the language "a two-electrode sing electrode and the counter electrode conductive electrolyte membrane."	recites the language "a two-electrode sing electrode and the counter electrode conductive electrolyte membrane." es not recite the language "wherein the nd the protonic conductive electrolyte
Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 49, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 49, presented reissue claim 79 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	61	79
Original Patent Claim	48	49

Original So 50	Presented Reissue Claim 79	Unlike original patent claim 50, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrodes, and having a thickness in the range of approximately 1 language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 50, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive materials." Unlike original patent claim 51, presented reissue claim 79 recites the language "a two-electrode electroderemical gas sensor," recites he language "a first protonic conductive electrode being the only two electrodes in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 51, presented reissue claim 79 does not recite the language "wherein the
		tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in the Claim Language
Fatent Claim	Keissue Claim	
52	79	Unlike original patent claim 52, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
^		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 52, presented reissue claim 79 does not recite the language "wherein
		one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of
		carbon black, and the other of the first and second electrical conductor materials for the sensing
		electrode is 1-50 wt% of platinum."
53	79	Unlike original patent claim 53, presented reissue claim 79 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 53, presented reissue claim 79 does not recite the language "wherein one
		of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon
		black, and the other of the first and second electrical conductor materials for the counter-reference

guage	recites the language "a two-electrode nic conductive electrolyte membrane in es, and having a thickness in the range he counter electrode being the only two rolyte membrane" and also recites the iameter in the range of approximately 1 cal measurement means."	es not recite the language "wherein the	recites the language "a two-electrode nic conductive electrolyte membrane in es, and having a thickness in the range he counter electrode being the only two rolyte membrane" and also recites the iameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 54, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	79		79
Original Patent Claim	54		55

Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 56, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	79		79
Original Patent Claim	99		57

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 58, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 79 does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material" and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode, the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode, the sensing electrode, means for electrical contact between the sensing electrode and the counter electrode; means for electrical measurement in electrical contact between the sensing electrode and the counter electrode and said reference electrode, whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies and the across said protonic electrolyte membrane applies and the counter electrode.
Presented Reissue Claim	79	
Original Patent Claim	58	59

nted Differences in the Claim Language Claim	Unlike original patent claim 60, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 60, presented reissue claim 79 does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	
Presented Reissue Claim	79		79
Original Patent Claim	09		61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	79		79
Original Patent Claim	62		63

guage	recites the language "a two-electrode nic conductive electrolyte membrane in es, and having a thickness in the range ne counter electrode being the only two rolyte membrane" and also recites the ameter in the range of approximately 1 al measurement means."	recites the language "a two-electrode nic conductive electrolyte membrane in as, and having a thickness in the range ne counter electrode being the only two rolyte membrane" and also recites the ameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 64, presented reissue claim 79 does not recite the language "wherein	said sensing, counter and reference electrodes comprise conductive metal oxides." Unlike original patent claim 65, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	79	79
Original Patent Claim	4	65

Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 66, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	62		79
Original Patent Claim	99		67

anguage	or recites the language "a two-electrode conductive electrolyte membrane in des, and having a thickness in the range the counter electrode being the only two ctrolyte membrane" and also recites the diameter in the range of approximately 1 ical measurement means."	and recite the failignage wherein the	9 recites the language "a two-electrode conic conductive electrolyte membrane in des, and having a thickness in the range the counter electrode being the only two ctrolyte membrane" and also recites the diameter in the range of approximately 1 ical measurement means."
Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	79		79
Original Patent Claim	89		69

Differences in the Claim Language		Unlike original patent claim 70, presented reissue claim 79 recites the language "a two-electrode	electrocalculated gas sensor, recites the language a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range	of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two	electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the	language "said sensing and counter electrodes each having a diameter in the range of approximately 1	mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 70, presented reissue claim 79 does not recite the language "wherein the	sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic	conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 79 recites the language "a two-electrode	electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in	nd in contact with the sensing and counter electrodes, and having a thickness in the range	of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two	electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the	language "said sensing and counter electrodes each having a diameter in the range of approximately 1	d being alcothing live connected to good alcothing measurement many 3	IIIII (O 17 IIIII), and ocing electrically confected to said electrical incasulcinent incans.	tent claim 71, presented reissue claim 79 does not recite the language "wherein the	Unlike original patent claim 71, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a	ginal patent claim 71, presented reissue claim 79 does not recite the language "wherein the and ionic conducting materials of said sensing, counter and reference electrodes are a stron mixed conductive material having 10-50 wt% of a proton conductor material and 50-	tent claim 71, presented reissue claim 79 does not recite the language "wherein the nic conducting materials of said sensing, counter and reference electrodes are a ixed conductive material having 10-50 wt% of a proton conductor material and 50-ind second electrical conductor materials."	Unlike original patent claim 71, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."	tent claim 71, presented reissue claim 79 does not recite the language "wherein the nic conductive materials of said sensing, counter and reference electrodes are a ixed conductive material having 10-50 wt% of a proton conductor material and 50-und second electrical conductor materials."
Differences in		Unlike original patent claim 70, presented rei	erectionical gas sensor, recites the languag between and in contact with the sensing and co	of approximately 0.1 mm to 1 mm, the sensing	electrodes in contact with the first protonic co	anguage "said sensing and counter electrodes e	mm to 15 mm, and being electrically connected	Unlike, original patent claim 70, presented reiss	sensing, counter and reference electrodes ha	conductive electrolyte membrane has a thicknes	Unlike original patent claim 71, presented rei	electrochemical gas sensor," recites the languag	between and in contact with the sensing and co	of approximately 0.1 mm to 1 mm, the sensing	electrodes in contact with the first protonic co	anguage "said sensing and counter electrodes e	nm to 15 mm, and being electrically connected		Unlike original patent claim 71, presented reiss	Unlike original patent claim 71, presented reiss electronic and ionic conducting materials of	Unlike original patent claim 71, presented reiss electronic and ionic conducting materials of a proton-electron mixed conductive material havi	Unlike original patent claim 71, presented reiss electronic and ionic conducting materials of soroton-electron mixed conductive material havious way, of a first and second electrical conductor	Unlike original patent claim 71, presented reiss electronic and ionic conducting materials of sproton-electron mixed conductive material haviout% of a first and second electrical conductor	Unlike original patent claim 71, presented reiss electronic and ionic conducting materials of soroton-electron mixed conductive material haviout% of a first and second electrical conductor
Presented	Reissue Claim	79									42							-	•		,	,		
Original	Patent Claim	70									71													

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
72	79	Unlike original patent claim 72, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 72, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73	79	Unlike original patent claim 73, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 73, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 74, presented reissue claim 79 does not recite the language "wherein	first and second electrical conductor materials for the counter and reference electrodes is of carbon black, and the other of the first and second electrical conductor materials for the reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 75, presented reissue claim 79 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Differences in	Unlike original patent claim 74, presented reissue claim 79 recites the language "a first protonic conductive electrolyte electrochemical gas sensor," recites the language "a first protonic conductive electrolyte between and in contact with the sensing and counter electrodes, and having a thicknee of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode bein electrodes in contact with the first protonic conductive electrolyte membrane" and a language "said sensing and counter electrodes each having a diameter in the range of a mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 74, presented reissue claim 79 does not recite the language.	one of the first and second electrical conductor materials f 50-99 wt% of carbon black, and the other of the first and se counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 79 recites the language "a electrochemical gas sensor," recites the language "a first protonic conductive electrolyte between and in contact with the sensing and counter electrodes, and having a thicknee of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode bein electrodes in contact with the first protonic conductive electrolyte membrane" and a language "said sensing and counter electrodes each having a diameter in the range of arm mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 75, presented reissue claim 79 does not recite the language sensing and the counter electrodes each have a first side opposite a second side, and whand electronic conducting materials are continuous from the first side to the opposite within each of the sensing and counter electrodes."
Presented Reissue Claim	79		79
Original Patent Claim	74		75

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 76, presented reissue claim 79 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 77, presented reissue claim 79 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	79	79
Original Patent Claim	76	77

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
78	62	Unlike original patent claim 78, presented reissue claim 79 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range
-		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 78, presented reissue claim 79 does not recite the language "wherein the
		sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein
		the ionic and electronic conducting materials are continuous from the first side to the opposite second
		side within each of the sensing, counter, and reference electrodes."

Original	Presented	Differences in the Claim Language	
Patent Claim	Reissue Claim		
-	08	Unlike original patent claim 1, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	sensing electrode sensing electrode de."
2	80	Unlike original patent claim 2, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	sensing electrode sensing electrode de."
		Unlike original patent claim 2, presented reissue claim 80 does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."	iguage "means for ectrical connection DC power across ting an electrical rical measurement trolyte membrane; s for applying DC to the sensing and

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
3	80	Unlike original patent claim 3, presented reissue claim 80 recites the language "the sensing electrode
		reacting with the gas to produce a change in an electrical characteristic between the sensing electrode
		and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 3, presented reissue claim 80 does not recite the language "wherein said
		sensing and counter electrodes comprise carbon."
4	80	Unlike original patent claim 4, presented reissue claim 80 recites the language "the sensing electrode
		reacting with the gas to produce a change in an electrical characteristic between the sensing electrode
		and the counter electrode in the absence of an applied voltage to the sensing electrode."
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Unlike original patent claim 4, presented reissue claim 80 does not recite the language "wherein said
		sensing and counter electrodes comprise noble metals."

Presented Differences in the Claim Language im Reissue Claim	80 Unlike original patent claim 7, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 80 does not recite the language" wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	80 Unlike original patent claim 8, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Original Patent Claim	7		∞	

Language	recites the language "the sensing electrode haracteristic between the sensing electrode ge to the sensing electrode."	does not recite the language "wherein the	m 80 recites the language "the sensing lectrical characteristic between the sensing blied voltage to the sensing electrode."	does not recite the language "wherein the
Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	80		80	
Original Patent Claim			10	

guage	80 recites the language "the sensing rical characteristic between the sensing d voltage to the sensing electrode." es not recite the language "wherein the	80 recites the language "the sensing trical characteristic between the sensing d voltage to the sensing electrode." bes not recite the language "wherein the
Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 11, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 12, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	08	80
Original Patent Claim	=	12

guage	30 recites the language "the sensing rical characteristic between the sensing I voltage to the sensing electrode."	es not recite the language "wherein the 10 mm, and the protonic conductive	30 recites the language "the sensing rical characteristic between the sensing I voltage to the sensing electrode."	es not recite the language "wherein the ounter electrodes are a proton-electron uctor material and 50-90 wt% of a first
Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 80 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	80		80	
Original Patent Claim	13		14	

uage	0 recites the language "the sensing ical characteristic between the sensing voltage to the sensing electrode."	s not recite the language "wherein the electrodes is a copolymer having a monomers containing at least one of a	0 recites the language "the sensing ical characteristic between the sensing voltage to the sensing electrode."	s not recite the language "wherein one sing electrode is 50-99 wt% of carbon materials for the sensing electrode is
Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	08	_	. 08	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 17, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 18, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	08	08
Original Patent Claim	17	18

Presented Differences in the Claim Language Reissne Claim	 	Unlike original patent claim 19, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Original Patent Claim	19		20	

mguage		80 recites the language "the sensing ctrical characteristic between the sensing ied voltage to the sensing electrode."	does not recite the language "wherein the second pumping electrodes comprise	80 recites the language "the sensing ctrical characteristic between the sensing led voltage to the sensing electrode."	does not recite the language "wherein the labout 10 mm, and the first protonic 17 mm."
Differences in the Claim Language		Unlike original patent claim 21, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 80 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	08		80	
Original	Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 23, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	08		. 08	
Original Patent Claim	23	·	24	

n Language	laim 80 recites the language "the sensing relectrical characteristic between the sensing upplied voltage to the sensing electrode." 80 does not recite the language "wherein one the first pumping electrode is 50-99 wt% of cal conductor materials for the first pumping	laim 80 recites the language "the sensing pelectrical characteristic between the sensing applied voltage to the sensing electrode." 80 does not recite the language "wherein one the second pumping electrode is 50-99 wt% electrical conductor materials for the second
Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 25, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 26, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	08	80
Original Patent Claim	25	26

Claim Language	ginal patent claim 27, presented reissue claim 80 recites the language "the sensing eacting with the gas to produce a change in an electrical characteristic between the sensing nd the counter electrode in the absence of an applied voltage to the sensing electrode." ginal patent claim 27, presented reissue claim 80 does not recite the language "wherein the mical gas sensor further comprises: a second protonic conductive electrolyte membrane; econd porous mixed ionic-electronic conductive pump electrodes each having both an conductive material and an ionic conductive material, each of said first and second pump being separate from said sensing and counter electrolyte membrane; means for applying a DC poss said second protonic electrolyte membrane; said first and second pump electrodes electrical connection therebetween said means for applying DC power across said second ectrolyte membrane applies a DC for applying DC power across said second protonic electrodes."	in an electrical characteristic between the sensing in an electrical characteristic between the sensing an applied voltage to the sensing electrode." aim 80 does not recite the language "wherein the ane is substantially comprised of a solid,
Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 27, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 80 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	08	08
Original Patent Claim	27	28

nguage	recites the language "a first protonic with the sensing and counter electrodes, to 1 mm, the sensing electrode reacting c between the sensing electrode and the sensing electrode" and also recites the liameter in the range of approximately 1 cal measurement means."	es not recite the language "wherein said	vith the sensing and counter electrodes, to 1 mm, the sensing electrode reacting c between the sensing electrode and the sensing electrode and the sensing electrode and the sensing electrode, and also recites the liameter in the range of approximately 1 cal measurement means."	es not recite the language "wherein said
Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 31, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 32, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	80		80	
Original Patent Claim	31		32	

nguage	or recites the language "a first protonic with the sensing and counter electrodes, to 1 mm, the sensing electrode reacting ic between the sensing electrode and the sensing electrode and the sensing electrode" and also recites the diameter in the range of approximately 1 cal measurement means."	bes not recite the language "wherein said ides."	or recites the language "a first protonic with the sensing and counter electrodes, to 1 mm, the sensing electrode reacting ic between the sensing electrode and the sensing electrode and the sensing electrode and also recites the diameter in the range of approximately 1 ical measurement means." The sensing electrode and the diameter in the range of approximately 1 ical measurement means." The sensing electrode and the diameter in the language wherein the loss not recite the language wherein the loss of a solid, perfluorinated, ion-
Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 33, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 34, presented reissue claim 80 does not recite the language wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	08		08
Original Patent Claim	33		34

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 35, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	08		08
Original Patent Claim I	35		36
L	L		

Differences in the Claim Language		Unlike original patent claim 37, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 37, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
		Unlik condt and h with count langu	Unlik	Unlik condi
Presented	Reissue Claim	08		08
Original	Patent Claim	37	•	38

	Description	Difference on the the Olivian I among the
Original	Fresented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	80	Unlike original patent claim 39, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes.
•		
		with the gas to produce a change in an electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of annoximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 39, presented reissue claim 80 does not recite the language "wherein the
		electrochemical gas sensor is adapted to detect H ₂ O vapor."
40	08	Unlike original patent claim 40, presented reissue claim 80 recites the language "a first protonic
		and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting
		with the gas to produce a change in an electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 40, presented reissue claim 80 does not recite the language "wherein the
		electrochemical gas sensor is adapted to detect INO _x .

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 80 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Original Presented Patent Claim Reissue Claim	80	80	
Original Patent Claim	41	42	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
	08	Unlike original patent claim 43, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 43, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
	08	Unlike original patent claim 44, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 44, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
45	08	Unlike original patent claim 45, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
	,	Unlike original patent claim 45, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46	08	Unlike original patent claim 46, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 46, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Original	Presented	Differences in the Claim Language	
Patent Claim	Reissue Claim		
47	80	Unlike original patent claim 47, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	rst protonic electrodes, ode reacting ode and the recites the
		Unlike original patent claim 47, presented reissue claim 80 does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being in contact with said perforated support structure composed of an electrical contact with said sensing electrode and perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.	conductive conductive conductive conducting and counter conductive ed off from aid counter l, both said perforated ug electrode d protonic ted support means for wer across tion of said

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 80 recites the language "presented reissue claim 80 recites the language the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 80 recites the language "presented reissue claim 80 recites the language the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 80 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	08	08	
Original Patent Claim	48	49	

uage	recites the language "a first protonic th the sensing and counter electrodes, of 1 mm, the sensing electrode reacting between the sensing electrode and the ensing electrode" and also recites the imeter in the range of approximately 1 Il measurement means."	s not recite the language "wherein the ounter electrodes are a proton-electron octor material and 50-90 wt% of a first	th the sensing and counter electrodes, of 1 mm, the sensing electrode reacting between the sensing electrode and the ensing electrode" and also recites the meter in the range of approximately 1 I measurement means."	s not recite the language "wherein the electrodes is a copolymer having a monomers containing at least one of a
Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 50, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 51, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim			. 08	·
Original Patent Claim	50		51	

ynage	th the sensing and counter electrodes, a 1 mm, the sensing electrode reacting between the sensing electrode and the ensing electrode, and also recites the ameter in the range of approximately 1 in measurement means."	s not recite the language "wherein one sing electrode is 50-99 wt% of carbon materials for the sensing electrode is	th the sensing and counter electrodes, of mm, the sensing electrode reacting between the sensing electrode and the ensing electrode," and also recites the meter in the range of approximately 1 measurement means."	s not recite the language "wherein one inter electrode is 50-99 wt% of carbon or materials for the counter-reference
Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 52, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 53, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	08		08	
Original Patent Claim	52		53	

yage	recites the language "a first protonic th the sensing and counter electrodes, of mm, the sensing electrode reacting between the sensing electrode and the tensing electrode" and also recites the imeter in the range of approximately 1 il measurement means."	s not recite the language "wherein the	th the sensing and counter electrodes, of mm, the sensing electrode reacting between the sensing electrode and the ensing electrode, and also recites the umeter in the range of approximately 1 I measurement means."	s not recite the language "wherein the
Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 54, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 55, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	80		08	
Original	54			

guage	recites the language "a first protonic ith the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately 1 al measurement means."	es not recite the language "wherein the	recites the language "a first protonic th the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 56, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO_x ."	Unlike original patent claim 57, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	08		· · · · · · · · · · · · · · · · · · ·
Original Patent Claim			. 57

nted Differences in the Claim Language Claim	Unlike original patent claim 58, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."		in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."
Presented Reissue Claim	80	80	
Original Patent Claim	58		

guage	recites the language "a first protonic ith the sensing and counter electrodes, o I mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately I al measurement means."	s not recite the language "wherein said	recites the language "a first protonic th the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 60, presented reissue claim 80 does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 61, presented reissue claim 80 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim			08
Original Patent Claim	09		

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 62, presented reissue claim 80 does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	08	80
Original Patent Claim	62	

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 64, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide electrolyte membrane is a metal oxide electrolyte electrol	Unlike original patent claim 65, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
	Unlike original parconductive electro and having a thick with the gas to procounter electrode language "said sen mm to 15 mm, and Unlike original parotonic conduction	Unlike original parconductive electro and having a thick with the gas to procounter electrode language "said sen mm to 15 mm, and Unlike original parelectrochemical ga
Presented Reissue Claim	08	08
Original Patent Claim	64	9

guage	recites the language "a first protonic ith the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode," and also recites the ameter in the range of approximately 1 al measurement means."	recites the language "a first protonic ith the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 66, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	80	80
Original Patent Claim	99	

guage	recites the language "a first protonic ith the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately 1 al measurement means."	recites the language "a first protonic ith the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode, and also recites the ameter in the range of approximately 1 al measurement means."
Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 68, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	08	
Original Patent Claim	89	. 69

guage	recites the language "a first protonic ith the sensing and counter electrodes, o I mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately I al measurement means."	es not recite the language "wherein the of about 10 mm, and the protonic mm."	recites the language "a first protonic ith the sensing and counter electrodes, o I mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately I il measurement means."	ss not recite the language "wherein the ounter and reference electrodes are a of a proton conductor material and 50-
Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 70, presented reissue claim 80 does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 71, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	08		08	
Original Patent Claim	70		71	

uage	recites the language "a first protonic th the sensing and counter electrodes, of mm, the sensing electrode reacting between the sensing electrode and the ensing electrode" and also recites the meter in the range of approximately 1 measurement means."	s not recite the language "wherein the reference electrodes is a copolymer rfluorinated monomers containing at	recites the language "a first protonic th the sensing and counter electrodes, of mm, the sensing electrode reacting between the sensing electrode and the ensing electrode" and also recites the meter in the range of approximately 1 measurement means."	s not recite the language "wherein one sing electrode is 50-99 wt% of carbon materials for the sensing electrode is
Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 72, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 73, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	08		08	
Original Patent Claim	72		73	

hage	the sensing and counter electrodes, of mm, the sensing electrode reacting between the sensing electrode and the ensing electrode, and also recites the umeter in the range of approximately 1 Il measurement means."	s not recite the language "wherein one inter and reference electrodes is 50-99 electrical conductor materials for the	recites the language "a first protonic th the sensing and counter electrodes, o I mm, the sensing electrode reacting between the sensing electrode and the ensing electrode" and also recites the imeter in the range of approximately I measurement means."	s not recite the language "wherein the e a second side, and wherein the ionic first side to the opposite second side
Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 74, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 75, presented reissue claim 80 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	08		08	
Original Patent Claim	74		75	

guage	recites the language "a first protonic ith the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately 1 al measurement means."	es not recite the language "wherein the ite a second side, and wherein the ionic first side to the opposite second side	recites the language "a first protonic ith the sensing and counter electrodes, o 1 mm, the sensing electrode reacting between the sensing electrode and the sensing electrode" and also recites the ameter in the range of approximately 1 al measurement means."	es not recite the language "wherein the des each have a first side opposite a materials are continuous from the first , counter, first pumping, and second
Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 76, presented reissue claim 80 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 77, presented reissue claim 80 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	80		80	
Original Patent Claim	76		77	

D. W. H	Dilierences in the Claim Language	Unlike original patent claim 78, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 78, presented reissue claim 80 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Drogontod	Reissue Claim	08
Original	Patent Claim	78

guage	recites the language "a two-electrode ig electrode and the counter electrode iic conductive electrolyte membrane," with the gas to produce a change in an counter electrode in the absence of an	recites the language "a two-electrode ig electrode and the counter electrode ic conductive electrolyte membrane," with the gas to produce a change in an counter electrode in the absence of an	es not recite the language "means for e membrane; an electrical connection means for applying DC power across means for alternating an electrical rode from the electrical measurement mic conductive electrolyte membrane; ode when the means for applying DC pplies a DC power to the sensing and
Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 81 does not recite the language "means for applying DC power across the protonic conductive electrolyte means for applying DC power across the protonic conductive electrode, and the means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
Presented Reissue Claim	81	81	
Original Patent Claim		2	-

nage	ecites the language "a two-electrode g electrode and the counter electrode ic conductive electrolyte membrane," with the gas to produce a change in an counter electrode in the absence of an	not recite the language "wherein said	ecites the language "a two-electrode g electrode and the counter electrode ic conductive electrolyte membrane," ith the gas to produce a change in an counter electrode in the absence of an	not recite the language "wherein said
Differences in the Claim Language	Unlike original patent claim 3, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 3, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 4, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	81		81	
Original Patent Claim	m		4	

d Differences in the Claim Language	aim	Unlike original patent claim 5, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 6, presented reissue claim 81 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented	Reissue Claim	81		81
Original	Patent Claim	~		9

		45.45		
Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 81 does not recite the language" wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	81		81	
Original Patent Claim	7		∞	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
6		Unlike original patent claim 9, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 9, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
10	81	Unlike original patent claim 10, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 10, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	81	Unlike original patent claim 13, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 81 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
41	81	Unlike original patent claim 14, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 14, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
15	81	Unlike original patent claim 15, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 15, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
16	8	Unlike original patent claim 16, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 16, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Original	Drecented	Differences in the Claim Language
Patent Claim	Reissue Claim	
17	81	Unlike original patent claim 17, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 17, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
	81	Unlike original patent claim 18, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 18, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."

im Language	vim 81 recites the language "a two-electroc sensing electrode and the counter electroc t protonic conductive electrolyte membrane acting with the gas to produce a change in a and the counter electrode in the absence of a 181 does not recite the language "wherein that and second pumping electrodes compris	vim 81 recites the language "a two-electroc sensing electrode and the counter electroc t protonic conductive electrolyte membrane acting with the gas to produce a change in and the counter electrode in the absence of and the does not recite the language "wherein that second pumping electrodes comprise nob
Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 19, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 20, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	. 81	
Original Patent Claim	19	20

guage	recites the language "a two-electrode g electrode and the counter electrode iic conductive electrolyte membrane," with the gas to produce a change in an counter electrode in the absence of an	es not recite the language "wherein the second pumping electrodes comprise	recites the language "a two-electrode g electrode and the counter electrode iic conductive electrolyte membrane," with the gas to produce a change in an counter electrode in the absence of an	es not recite the language "wherein the bout 10 mm, and the first protonic mm."
Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 81 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	. 81		81	
Original Patent Claim	21		22	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
23	81	Unlike original patent claim 23, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 23, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
24	. 81	Unlike original patent claim 24, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 24, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

ı Language	n 81 recites the language "a two-electrode sensing electrode and the counter electrode protonic conductive electrolyte membrane," ting with the gas to produce a change in an d the counter electrode in the absence of an	31 does not recite the language "wherein one the first pumping electrode is 50-99 wt% of cal conductor materials for the first pumping	n 81 recites the language "a two-electrode sensing electrode and the counter electrode protonic conductive electrolyte membrane," ting with the gas to produce a change in an d the counter electrode in the absence of an	31 does not recite the language "wherein one the second pumping electrode is 50-99 wt% lectrical conductor materials for the second
Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	81		81	
Original Patent Claim	25		26	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
27	81	Unlike original patent claim 27, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 27, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."
28	8	Unlike original patent claim 28, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 81 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 29, presented reissue claim 81 does not recite the language "wherein the second	Unlike original patent claim 30, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode being the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 81 does not recite the language "means for applying a DC pulse power source across the membrane; and switch means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical detectorical measurement means detects changes in said electrical detectorical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means counter electrodes."
Presented Reissue Claim	81	
Original Patent Claim	29	30

inted Differences in the Claim Language		Unlike original patent claim 33, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 33, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	
Presented	Reissue Claim	. 81		81
Original	Patent Claim	33		34

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
35	81	Unlike original patent claim 35, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
36	81	Unlike original patent claim 36, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim)
37		Unlike original patent claim 37, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode
		reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
	:	Unlike original patent claim 37, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
38	81	Unlike original patent claim 38, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		electrochemical gas sensor is adapted to detect H ₂ S."

Original Patent Claim 39	Presented Reissue Claim 81 81	Unlike original patent claim 39, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 39, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor." Unlike original patent claim 40, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and also
		recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."

guage	recites the language "a two-electrode ing electrode and the counter electrode conductive electrolyte membrane, the an electrical characteristic between the of an applied voltage to the sensing	recites the language "a two-electrode ing electrode and the counter electrode conductive electrolyte membrane, the an electrical characteristic between the of an applied voltage to the sensing	es not recite the language "wherein the lo mm, and the protonic conductive
Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 81 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	81	81	
Original Patent Claim	41	42	

Original Patent Claim 43	Presented Reissue Claim 81	Unlike original patent claim 43, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with
		the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 43, presented reissue claim 81 does not recite the language "wherein the
44	81	conductive material naving 10-50 wt% of a proton conductor material and 30-90 wt% of a first electrical conductor materials." Unlike original patent claim 44, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said
		Unlike original patent claim 44, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
45	81	Unlike original patent claim 45, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 45, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
. 46	81	Unlike original patent claim 46, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrode and the counter electrode and the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 46, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrode being the only two electrodes in contact with the sensing electrode and the counter electrode being the only two electrodes in contact with the sensing electrode and the counter electrode being the only two electrodes in contact with the sensing electrode and the counter electrode in the absence of an applied vollage to the sensing electrode and the counter electrode in the absence of an applied vollage to the sensing electrode and the counter electrode in the absence of an applied vollage to the sensing electrode and the counter electrode in the absence of an applied vollage to the sensing electrode. Unlike original patent claim 47, presented reissue claim 81 does not recite the language "a second protonic conductive electrody, membrane, first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conductive pump electrodes and situated on opposite sides of and in contact with said second protonic conductive electrody and second protons pump electrode being expearate from said sensing and counter electrode by a perforated support structure composed of an electrode being expearated from said sensing electrode and perforated support structure composed of an electrode being exparated from said sensing electrode and perforated support structure composed of an electrode being exparated from said sensing electrode and perforated support structure, means for electrical measurement in electrical contact with said sensing electrode when the means for applying a DC power across said second protonic electrolyte membrane and protonic electrolyte membrane, and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical ch
Presented Reissue Claim	81
Original Patent Claim	

anguage	81 recites the language "a two-electrode se "the sensing electrode and the counter the first protonic conductive electrolytes to produce a change in an electrical ter electrode in the absence of an applied	81 recites the language "a two-electrode can the sensing electrode and the counter the first protonic conductive electrolytes to produce a change in an electrical ter electrode in the absence of an applied	does not recite the language "wherein the, and the protonic conductive electrolyte
Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 81 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	81	81	
Original Patent Claim	48	49	

yuage	recites the language "a two-electrode nductive electrolyte membrane in between a thickness in the range of approximately ng the only two electrodes in contact with ctrode reacting with the gas to produce a and the counter electrode in the absence of uage "said sensing and counter electrodes n, and being electrically connected to said	ss not recite the language "wherein the er electrodes are a proton-electron mixed ial and 50-90 wt% of a first and a second	recites the language "a two-electrode nductive electrolyte membrane in between a thickness in the range of approximately ng the only two electrodes in contact with ctrode reacting with the gas to produce a and the counter electrode in the absence of und the counter electrode in the absence of under what said sensing and counter electrodes in, and being electrically connected to said a recite the language "wherein the proton a copolymer having a tetrafluorethylene at least one of a sulfonic acid group or a
Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 50, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 51, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	81		81
Original Patent Claim	50		51

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
52	81	Unlike original patent claim 52, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 52, presented reissue claim 81 does not recite the language "wherein one of the
		first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
	81	Unlike original patent claim 53, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 53, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 54, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
	Unlike original pate electrochemical gas between and in com of approximately 0. electrodes in contacreacting with the galand the counter electites the language approximately 1 mmeans."	Unlike original pate electrochemical gas	Unlike original pate electrochemical gas between and in com of approximately 0. electrodes in contacreacting with the ga and the counter elercites the language approximately 1 mmeans." Unlike original pate electrochemical gas
Presented Reissue Claim	81		81
Original Patent Claim	. 54		55

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
56	81	Unlike original patent claim 56, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
57	81	Unlike original patent claim 57, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

m Language	patent claim 58, presented reissue claim 81 recites the language "a two-electrode is sensor," recites the language "a first protonic conductive electrolyte membrane in between the sensing and counter electrodes, and having a thickness in the range of approximately the sensing electrode and the counter electrode being the only two electrodes in contact with conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a trical characteristic between the sensing electrode and the counter electrode in the absence of e to the sensing electrode," and also recites the language "said sensing and counter electrodes meter in the range of approximately 1 mm to 15 mm, and being electrically connected to said ament means."	or acception to the language wherein the	test the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the rode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode fer electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being onnected to said electrical measurement means." all patent claim 59, presented reissue claim 81 does not recite the language "a protonic conductive membrane being in contact with the avoing top and bottom sides, said top side of said protonic conductive membrane being in contact with the rode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the electrode; means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a Betrical and whereby, in a positive ambient concentration of said gas, said electrical and application of said gas, said electrical and application and applications.
Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrodes membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reasuse claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 81 does not recite the language "a protonic conductive membrane being in contact with the counter electrode, means for applying a DC power across said protonic conductive membrane being in contact with the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane, and whereby, in a positive ambient concentration of said gas, said electrical and alectrical and alectrica
Presented Reissne Claim	81	01	≅
Original Patent Claim	28	03	· · · · ·

aim Language	ginal patent claim 60, presented reissue claim 81 recites the language "a two-electrode mical gas sensor," recites the language "a first protonic conductive electrolyte membrane in nd in contact with the sensing and counter electrodes, and having a thickness in the range mately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two in contact with the first protonic conductive electrolyte membrane, the sensing electrode in contact with the absence of an applied voltage to the sensing electrode" and also language "said sensing and counter electrodes each having a diameter in the range of tely 1 mm to 15 mm, and being electrically connected to said electrical measurement ginal patent claim 60, presented reissue claim 81 does not recite the language "wherein said	laim 81 recites the language "a two-electrode rst protonic conductive electrolyte membrane in electrodes, and having a thickness in the range de and the counter electrode being the only two we electrolyte membrane, the sensing electrode cal characteristic between the sensing electrode ied voltage to the sensing electrode ally connected to said electrical measurement ally connected to said electrical measurement as metals."
Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 61, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 61, presented reissue claim 81 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	81	
Original Patent Claim	09	61

ented Differences in the Claim Language Claim		sensing, counter and reference electrodes comprise conductive metal oxides." Unlike original patent claim 63, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 81 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	81	™
Original Patent Claim	62	63

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
64	81	Unlike original patent claim 64, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
	81	Unlike original patent claim 65, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
889	81	Unlike original patent claim 68, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 68, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H,S."
69	81	Unlike original patent claim 69, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

yuage	recites the language "a two-electrode aductive electrolyte membrane in between a thickness in the range of approximately ng the only two electrodes in contact with cirode reacting with the gas to produce a nd the counter electrode in the absence of uage "said sensing and counter electrodes n, and being electrically connected to said	recite the language "wherein the sensing, and the protonic conductive electrolyte	recites the language "a two-electrode iductive electrolyte membrane in between a thickness in the range of approximately ng the only two electrodes in contact with strode reacting with the gas to produce a nd the counter electrode in the absence of uage "said sensing and counter electrodes 1, and being electrically connected to said s not recite the language "wherein the and reference electrodes are a proton-nductor material and 50-90 wt% of a first
Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 70, presented reissue claim 81 does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 71, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	81		81
Original Patent Claim	70		71

Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 72, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a	tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group." Unlike original patent claim 73, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language and having a thickness in the range of approximately on mm to 1 mm, the sensing and counter electrodes, and having a thickness in the range of approximately on 1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 73, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
		etrafluorethylene backbone with a side chain of perfluacid group or a carboxylic acid group." Unlike original patent claim 73, presented reissue electrochemical gas sensor," recites the language "a finand in contact with the sensing and counter electrode 0.1 mm to 1 mm, the sensing electrode and the counter the first protonic conductive electrolyte membrane, the change in an electrical characteristic between the sension applied voltage to the sensing electrode" and also reach having a diameter in the range of approximately 1 electrical measurement means." Unlike original patent claim 73, presented reissue claifirst and second electrical conductor materials for the sother of the first and second electrical conductor materials.
Presented Reissue Claim	81	81
Original Patent Claim	72	73

	T .	
yage	recites the language "a two-electrode anductive electrolyte membrane in between a thickness in the range of approximately sing the only two electrodes in contact with extrode reacting with the gas to produce a and the counter electrode in the absence of guage "said sensing and counter electrodes in, and being electrically connected to said recite the language "wherein the sensing side, and wherein the ionic and electronic	recites the language "a two-electrode onductive electrolyte membrane in between a thickness in the range of approximately ing the only two electrodes in contact with extrode reacting with the gas to produce a and the counter electrode in the absence of guage "said sensing and counter electrodes in, and being electrically connected to said trecite the language "wherein the sensing, e a first side opposite a second side, and is from the first side to the opposite second oumping electrodes."
Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 76, presented reissue claim 81 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic	Unlike original patent claim 77, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 77, presented reissue claim 81 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping, and second pumping electrodes."
Presented Reissue Claim	81	81
Original Patent Claim	76	77

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 78, presented reissue claim 81 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim		
Original Patent Claim	78	

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Onginal Patent Claim	Reissue Claim	
_	82	Unlike original patent claim 1, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 1, presented reissue claim 82 does not recite the language "quantitative measurement."
2	. 82	Unlike original patent claim 2, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 2, presented reissue claim 82 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the
		means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical means to the means for applying DC nower socked the means to the means to the means for applying DC nower socked the means to the means to the means to the means for applying DC nower socked the means to the means to the means for applying DC nower socked the means to the me
		membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
3	82	Unlike original patent claim 3, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 3, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	. 82	Unlike original patent claim 4, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 4, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Difference I also Chair I	Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
4	Presented Reissue Claim	82		82	
	Original Patent Claim	2		9	

guage	es the language "the sensing electrode first protonic conductive electrolyte	s not recite the language "quantitative in the protonic conductive electrolyte brane."	es the language "the sensing electrode first protonic conductive electrolyte	s not recite the language "quantitative ein the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	82		. 83	
Original Patent Claim	7		∞ ·	

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 82 recites the language "the sensing electrode	and the counter electrode being on opposite sides of the first protonic conductive electrolyte	Unlike original patent claim 9, presented reissue claim 82 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the electrochemical gas sensor is	adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 82 recites the language "the sensing	electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte	membrane."	Unlike original patent claim 10, presented reissue claim 82 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the electrochemical gas sensor is	adapted to detect hydrogen."
Presented	Reissue Claim	82					82					
	Patent Claim	6					10					

guage	12 recites the language "the sensing he first protonic conductive electrolyte	ss not recite the language "quantitative ein the electrochemical gas sensor is	12 recites the language "the sensing he first protonic conductive electrolyte	es not recite the language "quantitative ein the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 11, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	82		82	
Original Patent Claim	11		12	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
13	83	Unlike original patent claim 13, presented reissue claim \$2 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
14	82	Unlike original patent claim 14, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

guage	32 recites the language "the sensing he first protonic conductive electrolyte	es not recite the language "quantitative the proton conductor material for both strafluorethylene backbone with a side ulfonic acid group or a carboxylic acid	32 recites the language "the sensing he first protonic conductive electrolyte	es not recite the language "quantitative" one of the first and second electrical carbon black, and the other of the first ode is 1-50 wt% of platinum."
Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	82		82	
Original Patent Claim	15		16	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
17	85	Unlike original patent claim 17, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 17, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
18	83	Unlike original patent claim 18, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 18, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.

		Unlike original patent claim 19, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 19, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon." Unlike original patent claim 20, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise poble metals."
· → · □ · ·	Original Reis 19	Pre Reiss

guage	32 recites the language "the sensing he first protonic conductive electrolyte	es not recite the language "quantitative in the electronic and ionic conducting conductive metal oxides."	22 recites the language "the sensing he first protonic conductive electrolyte	es not recite the language "quantitative lerein the first and second pumping onic conductive electrolyte membrane
Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		82	
Original Patent Claim	21		22	

ıage	recites the language "the sensing e first protonic conductive electrolyte	inot recite the language "quantitative the electronic and ionic conducting n-electron mixed conductive material 14% of a first and a second electrical	recites the language "the sensing e first protonic conductive electrolyte	not recite the language "quantitative ne proton conductor material for both a tetrafluorethylene backbone with a a sulfonic acid group or a carboxylic
Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	82 .		82	
Original Patent Claim	23		24	

guage	,	82 recites the language "the sensing the first protonic conductive electrolyte	es not recite the language "quantitative none of the first and second electrical % of carbon black, and the other of the umping electrode is 10 to 50 wt% of	82 recites the language "the sensing the first protonic conductive electrolyte	es not recite the language "quantitative n one of the first and second electrical wt% of carbon black, and the other of and pumping electrode is 10 to 50 wt%
Differences in the Claim Language		Unlike original patent claim 25, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented	Reissue Claim	82		82	
Original	Patent Claim	25		26	

Original Patent Claim	Presented Descended	Differences in the Claim Language
27	82	Unlike original patent claim 27, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 27, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive pump electrodes each having both an electronic conductive material, each of said first and second pump electronic separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second
		protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.
28	82	Unlike original patent claim 28, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 28, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Ве	s the language "the sensing electrode ic conductive electrolyte membrane." not recite the language "quantitative econd protonic conductive electrolyte e."	cites the language "a first protonic le sensing and counter electrodes, and n," recites the language "the sensing of first protonic conductive electrolyte relectrodes each having a diameter in trically connected to said electrical surement; means for applying a DC unter electrodes having in electrical er across the membrane; and switch ounter electrodes from the electrical sensing and counter electrodes; and sensing and counter electrodes; and he membrane moves CO away from a aid switch means connects said means ensing and counter electrodes."
Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 29, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 82 does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane means for applying a DC pulse power source across the membrane means connects said means for applying a DC pulse power source across the membrane as ideal means connects said means for applying a DC pulse power source across the membrane as the sensing and counter electrodes."
Presented Reissue Claim	82	83
Original Patent Claim	29	30

uage	ecites the language "a first protonic th the sensing and counter electrodes, a to 1 mm, recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to the first the language."	s not recite the language quantitative is said sensing and counter electrodes	ecites the language "a first protonic th the sensing and counter electrodes, to 1 mm, recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to	s not recite the language "quantitative said sensing and counter electrodes
Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 32, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	82		82	
Original Patent Claim			32	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33		Unlike original patent claim 33, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 33, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34	82	Unlike original patent claim 34, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 34, presented reissue claim 82 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

hage	recites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to	not recite the language "quantitative he protonic conductive electrolyte brane."	recites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to so not recite the language "quantitative in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 35, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	82		
Original Patent Claim	35		36

uage	ecites the language "a first protonic h the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to	s not recite the language "quantitative electrochemical gas sensor is adapted	ecites the language "a first protonic h the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each h, and being electrically connected to	not recite the language "quantitative in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 37, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 38, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	82		82	
Original Patent Claim	37		38	

Differences in the Claim Language		Unlike original patent claim 39, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 39, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect HO vanor."	Unlike original patent claim 40, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented	Reissue Claim	83	83
Original	Patent Claim	39	

guage	22 recites the language "the sensing he first protonic conductive electrolyte	s not recite the language "quantitative	12 recites the language "the sensing he first protonic conductive electrolyte	ss not recite the language "quantitative in the sensing and counter electrodes electrolyte membrane has a thickness
Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 41, presented reissue claim 82 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 42, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		82	
Original Patent Claim	41		.42	

uage	recites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to	s not recite the language "quantitative the electronic and ionic conducting relectron mixed conductive material xt% of a first and a second electrical	recites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to	s not recite the language "quantitative he proton conductor material for both rafluorethylene backbone with a side lfonic acid group or a carboxylic acid	
Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 43, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 44, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	
Presented Reissue Claim	. 85		82		
Original Patent Claim	43		\$		

uage	ecites the language "a first protonic the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each n, and being electrically connected to	one of the first and second electrical arbon black, and the other of the first de is 1-50 wt% of platinum."	ecites the language "a first protonic h the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each n, and being electrically connected to	one of the first and second electrical arbon black, and the other of the first de is 1-50 wt% of Ru oxide."
Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 45, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 46, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	82		82	
Original Patent Claim	45		46	

anguage	with the sensing and counter electrodes, mm to 1 mm," recites the language "the site sides of the first protonic conductive id sensing and counter electrodes each of mm, and being electrically connected to mm, and being electrically connected to mm, and being electrically connected to me, and being electrodes, each having ng material, each of said first and second onter electrodes and situated on opposite electrolyte membrane; said first porous m the ambient atmosphere; said second ectrode by a perforated support structure second porous pump electrode and said support structure; means for electrical each descrical contact with are; whereby the gas is transported away and protonic electrolyte membrane; and protonic electrical measurement means detects
Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm, to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite isides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 47, presented reissue claim 82 does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conductive pump electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first and second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being exposed to a chamber sealed off from the ambient structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said sensing electrode by a perforated support structure; means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrol
Presented Reissue Claim	85
Original Patent Claim	47

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 82 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 49, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		82	
Original Patent Claim	48		49	·

	Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 50, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 51, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
F. 35.43	Differences in th	Unlike original patent claim 50, presented reiss conductive electrolyte membrane in between and and having a thickness in the range of approxim sensing electrode and the counter electrode being electrolyte membrane," and also recites the lan having a diameter in the range of approximately 1 said electrical measurement means."	Unlike, original patent claim 50, presented reissue measurement," and also does not recite the lang materials of said sensing and counter electrodes having 10-50 wt% of a proton conductor materials."	Unlike original patent claim 51, presented reiss conductive electrolyte membrane in between and and having a thickness in the range of approxim sensing electrode and the counter electrode being electrolyte membrane," and also recites the lan having a diameter in the range of approximately 1 said electrical measurement means." Unlike original patent claim 51, presented reissue measurement," and also does not recite the langua the sensing and counter electrodes is a copolyme chain of perfluorinated monomers containing at legroup."
December	riescilled Reissue Claim	83		83
10.10	Patent Claim	90		51

guage	recites the language "a first protonic ith the sensing and counter electrodes, a to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each im, and being electrically connected to	es not recite the language "quantitative one of the first and second electrical carbon black, and the other of the first de is 1-50 wt% of platinum."	recites the language "a first protonic ith the sensing and counter electrodes, it to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to	ss not recite the language "quantitative one of the first and second electrical carbon black, and the other of the first erence electrode is 1-50 wt% of Ru
Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 52, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 53, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	83	٠ ر	82	
Original Patent Claim	52		53	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
54	82	Unlike original patent claim 54, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 54, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
55	82	Unlike original patent claim 55, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 55, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Differences in the Claim I and and		Unlike original patent claim 56, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 56, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 57, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented	Reissue Claim	83		82	
Original	Patent Claim	99		57	

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 58, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."	Unlike original patent claim 59, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes sach having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "a protonic conductive electronic conducting material and an ionic conducting material" and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode, means for electrical measurement in electrical contact between the sensing electrode and the counter electrode, means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte.
Presented Reissue Claim	83	88
Original Patent Claim	28	59

Original	Presented	Differences in the Claim I andiane
Patent Claim	Reissue Claim	
09	82	Unlike original patent claim 60, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 60, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."
61	82	Unlike original patent claim 61, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 61, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Claim Language	ginal patent claim 62, presented reissue claim 82 recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the extrode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each iameter in the range of approximately 1 mm to 15 mm, and being electrically connected to cal measurement means."	ginal patent claim 62, presented reissue claim 82 does not recite the language "quantitative ent," and also does not recite the language "wherein said sensing, counter and reference comprise conductive metal oxides."	ginal patent claim 63, presented reissue claim 82 recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the extrode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each lameter in the range of approximately 1 mm to 15 mm, and being electrically connected to cal measurement means."	aim 82 does not recite the language "quantitative ge "wherein the protonic conductive electrolyte luorinated, ion-exchange polymer."
Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 62, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 63, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim			88	
Original Patent Claim	62		63	

Original	Dresented	Differences in the Claim I amman
Patent Claim	Reissue Claim	
64	82	Unlike original patent claim 64, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 64, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
. 59	82	Unlike original patent claim 65, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 65, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	82	Unlike original patent claim 66, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 66, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
67	83	Unlike original patent claim 67, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

n Language	inal patent claim 68, presented reissue claim 82 recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the strode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each imeter in the range of approximately 1 mm to 15 mm, and being electrically connected to all measurement means."	82 does not recite the language "quantitative "wherein the electrochemical gas sensor is	inal patent claim 69, presented reissue claim 82 recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the strode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each imeter in the range of approximately 1 mm to 15 mm, and being electrically connected to all measurement means."	82 does not recite the language "quantitative "wherein the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 68, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 69, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim				
Original Patent Claim	89		69	

aim Language	ginal patent claim 70, presented reissue claim 82 recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the extrode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each ameter in the range of approximately 1 mm to 15 mm, and being electrically connected to cal measurement means."	im 82 does not recite the language "quantitative e "wherein the sensing, counter and reference protonic conductive electrolyte membrane has a	ginal patent claim 71, presented reissue claim 82 recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the extrode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each ameter in the range of approximately 1 mm to 15 mm, and being electrically connected to cal measurement means."	ginal patent claim 71, presented reissue claim 82 does not recite the language "quantitative ent," and also does not recite the language "wherein the electronic and ionic conducting of said sensing, counter and reference electrodes are a proton-electron mixed conductive aving 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second conductor materials."
Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 70, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."		Unlike original patent claim 71, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	83		82	
Original Patent Claim	70		71	

Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 72, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 73, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reisene Claim	82		82	
Original Patent Claim	72		73	

Language	1 82 recites the language "a first protonic let with the sensing and counter electrodes, 1 mm to 1 mm," recites the language "the sosite sides of the first protonic conductive said sensing and counter electrodes each 15 mm, and being electrically connected to 2 does not recite the language "quantitative lerein one of the first and second electrical des is 50-99 wt% of carbon black, and the 5 for the counter and reference electrodes is	1 82 recites the language "a first protonic let with the sensing and counter electrodes, I mm to I mm," recites the language "the losite sides of the first protonic conductive said sensing and counter electrodes each 15 mm, and being electrically connected to 2 does not recite the language "quantitative rein the sensing and the counter electrodes erein the ionic and electronic conducting second side within each of the sensing and
Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 74, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt%, of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt%, of Ru oxide."	Unlike original patent claim 75, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 75, presented reissue claim 82 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	83	83
Original Patent Claim	74	75

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
76		Unlike original patent claim 76, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 76, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
77		Unlike original patent claim 77, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 77, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."

ıge	cites the language "a first protonic the sensing and counter electrodes, o 1 mm," recites the language "the ides of the first protonic conductive assing and counter electrodes each, and being electrically connected to	not recite the language "quantitative the sensing, counter, and reference wherein the ionic and electronic sosite second side within each of the
Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 78, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim	85	
Original Patent Claim	78	

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Patent Clàim	Reissue Claim	Differences in the Claim Language
1	83	Unlike original patent claim 1, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
2	83	Unlike original patent claim 1, presented reissue claim 83 does not recite the language "quantitative measurement." Unlike original patent claim 2, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 2, presented reissue claim 83 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrody from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
£	83	Unlike original patent claim 3, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 3, presented reissue claim 83 does not recite the language "quantitative measurement," and
4	83	Unlike original patent claim 4, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 4, presented reissue claim 83 does not recite the language "quantitative measurement," and
		also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	83		83	·
Original Patent Claim	5		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented	83	·	83	
Original	7		∞	

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Differences in the Claim Language	nta di	Unlike original patent claim 9, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 9, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
		Unlike original patent claim 9, presented and the counter electrode being on opmembrane," and also recites the languagare the only two electrodes in contact with	Unlike original patent claim 9, presented measurement," and also does not recite that adapted to detect NO _x ."	Unlike original patent claim 10, prese electrode and the counter electrode being membrane," and also recites the language are the only two electrodes in contact with	Unlike original patent claim 10, presented measurement," and also does not recite adapted to detect hydrogen."
Presented	Reissue Claim	83		83	
Original	Patent Claim	6		10	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
. 11	83	Unlike original patent claim 11, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 11, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
12	83	Unlike original patent claim 12, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 12, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Orioinal	Presented	Differences in the Claim I andiage
Patent Claim	Reissue Claim	
13	83	Unlike original patent claim 13, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
14	83	Unlike original patent claim 14, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
	Unlike original pelectrode and the membrane," and a are the only two el	Unlike original pa measurement," an the sensing and co chain of perfluorir group."	Unlike original pelectrode and the membrane, " and are the only two el	Unlike original pa measurement," an conductor materia and second electri
Presented Reissue Claim	83		83	
Original Patent Claim	15		16	

Original Patent Claim 17	Presented Reissue Claim 83	Unlike original patent claim 17, presented reissue claim 83 recites the language "the sensing
		electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 17, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
18	83	Unlike original patent claim 18, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 18, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC
		therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.

uage	2	3 recites the language "the sensing ne first protonic conductive electrolyte ig electrode and the counter electrode ductive electrolyte membrane."	onot recite the language "quantitative he electronic and ionic conducting arbon."	3 recites the language "the sensing ne first protonic conductive electrolyte ig electrode and the counter electrode ductive electrolyte membrane."	s not recite the language "quantitative n the electronic and ionic conducting oble metals."
Differences in the Claim Language		Unlike original patent claim 19, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 19, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 20, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise poble metals."
Presented	Reissue Claim	83		83	
Original	Patent Claim	19		20	

age	recites the language "the sensing first protonic conductive electrolyte electrode and the counter electrode uctive electrolyte membrane."	not recite the language "quantitative electronic and ionic conducting nductive metal oxides."	recites the language "the sensing first protonic conductive electrolyte electrode and the counter electrode uctive electrolyte membrane."	not recite the language "quantitative ein the first and second pumping nic conductive electrolyte membrane
Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	83		83	
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	83		83	
Original Patent Claim	23		24	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	0
25	83	Unlike original patent claim 25, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 25, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."
26	83	Unlike original patent claim 26, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 26, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."

uage	e language "the sensing electrode and the ductive electrolyte membrane," and also relectrode are the only two electrodes in d also recites the language "in which the trodes in contact with the first protonic	ecite the language "quantitative ctrochemical gas sensor further and second porous mixed ionic-electronic e material and an ionic conducting from said sensing and counter econd protonic conductive electrolyte nic electrolyte membrane; said first and said means for applying DC power transported away from the counter protonic electrolyte membrane applies a	e language "the sensing electrode and the ductive electrolyte membrane," and also relectrode are the only two electrodes in d also recites the language "in which the trodes in contact with the first protonic so not recite the language "quantitative second protonic conductive electrolyte cchange polymer."
Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 27, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrody membrane," and also recites the language "in which the sensing electrode and the counter electrody are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 28, presented reissue claim 83 does not recite the language "quantitative membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	83		83
Original Patent Claim	27		28

age	language "the sensing electrode and the ve electrolyte membrane," and also recites are the only two electrodes in contact with the language "quantitative d protonic conductive electrolyte	the language "a first protonic conductive unter electrodes, and having a thickness in sensing electrode and the counter electrode brane," and also recites the language "said approximately 1 mm to 15 mm, and being recites the language "in which the sensing contact with the first protonic conductive and counter electrodes having electrically is for applying a DC pulse power source crical connection therebetween said means for alternating the connection between the othe means for applying a DC pulse power ectrical measurement means to the sensing pulse power source across the membrane ctrode is placed when said switch means he membrane to the sensing and counter
Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 29, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane"	Unlike original patent claim 30, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 30, presented reissue claim 83 does not recite the language "said sensing and counter electrodes having in electrical measurement; means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; when said switch means connects said electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electricals and whereby said means for applying a DC pulse power source across the membrane; when said sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane for applying a DC pulse power source across the membrane felectrodes."
Presented Reissue Claim	83	83
Original Patent Claim	29	30

uage	the sensing and counter electrodes, a for 1 mm, recites the language "the sides of the first protonic conductive sensing and counter electrodes each a, and being electrically connected to tage "in which the sensing electrode ict with the first protonic conductive	not recite the language "quantitative iid sensing and counter electrodes	ecites the language "a first protonic." In the sensing and counter electrodes, a to 1 mm, recites the language "the sides of the first protonic conductive sensing and counter electrodes each in, and being electrically connected to lage "in which the sensing electrode of with the first protonic conductive in our recite the language "quantitative".	said sensing and counter electrodes
Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 31, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	83		83	
Original Patent Claim	31		32	

Original Patent Claim 33	Presented Reissue Claim 83	Unlike original patent claim 33, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode
34	83	Unlike original patent claim 33, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides." Unlike original patent claim 34, presented reissue claim 83 fecites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in the Claim Language
35	83	Unlike original patent claim 35, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 35, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte
	83	Unlike original patent claim 36, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode electrolyte membrane." Unlike original patent claim 36, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

uage	ecites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to tage "in which the sensing electrode ict with the first protonic conductive not recite the language "quantitative ie electrochemical gas sensor is	ecites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to uage "in which the sensing electrode act with the first protonic conductive in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in confact with the first protonic conductive electrolyte membrane." Unlike original patent claim 39, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 40, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NOx."
Presented Reissue Claim	83	83
Original Patent Claim	39	40

Language		im 83 recites the language "the sensing	s of the first protonic conductive electrolyte	sensing electrode and the counter electrode	ic conductive electrolyte membrane."	3 does not recite the language "quantitative		im 83 recites the language "the sensing	s of the first protonic conductive electrolyte	sensing electrode and the counter electrode	ic conductive electrolyte membrane."	 3 does not recite the language "quantitative	wherein the sensing and counter electrodes	electrolyte membrane has a thickness	•
 Differences in the Claim Language		Unlike original patent claim 41, presented reissue claim 83 recites the language "the sensing	electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte	membrane," and also recites the language "in which the sensing electrode and the counter electrode	are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 41, presented reissue claim 83 does not recite the language "quantitative	measurement."	Unlike original patent claim 42, presented reissue claim 83 recites the language "the sensing	electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte	membrane," and also recites the language "in which the sensing electrode and the counter electrode	are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 42, presented reissue claim 83 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the sensing and counter electrodes	have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness	of about 0.17 mm."
Presented	Keissue Claim	83						83							
 Original	ratent Claim	41						42							

m Language	inal patent claim 43, presented reissue claim 83 recites the language "a first protonic conductive membrane in between and in contact with the sensing and counter electrodes, and having a the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the ctrode being on opposite sides of the first protonic conductive electrolyte membrane," and also anguage "said sensing and counter electrodes each having a diameter in the range of approximately mm, and being electrically connected to said electrical measurement means," and also recites the n which the sensing electrode and the counter electrode are the only two electrodes in contact with tonic conductive electrolyte membrane."	bes not recite the language "quantitative the electronic and ionic conducting materials of a conductive material having 10-50 wt% of a	nal patent claim 44, presented reissue claim 83 recites the language "a first protonic conductive membrane in between and in contact with the sensing and counter electrodes, and having a the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the strode being on opposite sides of the first protonic conductive electrolyte membrane," and also inguage "said sensing and counter electrodes each having a diameter in the range of approximately mm, and being electrically connected to said electrical measurement means," and also recites the onic conductive electrolyte membrane."	t," and also does not recite the language "wherein the proton conductor material for both the counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 43, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and a second electron conductor material and 50-90 wt% of a first and 50-90 wt% of a fir	Unlike original patent claim 44, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 44, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	83		83	
Original Patent Claim	43		44	

Ougman	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
47		Unlike original patent claim 47, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 47, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode and said counter electrode being in contact with said perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."

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Differences in the Claim Language		Unlike original patent claim 48, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 83 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 49, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	83		83	,
Original	Patent Claim	48		49	

Original Patent Claim 50	Presented Reissue Claim 83	Unlike original patent claim 50, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately
		1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 50, presented reissue claim 83 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a first and a second electrical conductor materials."
51	83	Unlike original patent claim 51, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 51, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim)
52	83	Unlike original patent claim 52, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 52, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
53	83	Unlike original patent claim 53, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 53, presented reissue claim 83 does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
56	83	Unlike original patent claim 56, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 56, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57		Unlike original patent claim 57, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in confact with the first protonic conductive electrolyte membrane." Unlike original patent claim 57, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

d Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 58, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 59, presented reissue claim 83 does not recite the language "a portonic conductive reference electrode and also does not recite the language "a portonic conductive reference electrode and also does not recite the language "a protonic conductive membrane being in contact with the sensing electrode and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protoni
Presented Reissue Claim	83	83
Original Patent Claim	58	59

Claim Language	ginal patent claim 60, presented reissue claim 83 recites the language "a first protonic; electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the ectrode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each iameter in the range of approximately 1 mm to 15 mm, and being electrically connected to ical measurement means," and also recites the language "in which the sensing electrode unter electrode are the only two electrodes in contact with the first protonic conductive membrane."	ginal patent claim 60, presented reissue claim 83 does not recite the language "quantitative snt," and also does not recite the language "wherein said sensing, count and reference comprise carbon."	ginal patent claim 61, presented reissue claim 83 recites the language "a first protonic; electrolyte membrane in between and in contact with the sensing and counter electrodes, a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the ectrode and the counter electrode being on opposite sides of the first protonic conductive membrane," and also recites the language "said sensing and counter electrodes each iameter in the range of approximately 1 mm to 15 mm, and being electrically connected to ical measurement means," and also recites the language "in which the sensing electrode unter electrode are the only two electrodes in contact with the first protonic conductive membrane."	ginal patent claim 61, presented reissue claim 83 does not recite the language "quantitative ent," and also does not recite the language "wherein said sensing, count and reference comprise noble metals."
Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 60, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 61, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	83			
Original Patent Claim	09		61	

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 62, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 62, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in confact with the first protonic conductive electrolyte membrane." Unlike original patent claim 63, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated ion-exchange polymer."
Original Patent Claim	62		

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim))
64	83	hn _
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and heing electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 64, presented reissue claim 83 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
99	83	
		_
	-	and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike original patent claim 65, presented reissue claim 83 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
89	83	Unlike original patent claim 68, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the grant of grant of the sensing and counter electrodes.
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike, original patent claim 68, presented reissue claim 83 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
69	83	Unlike original patent claim 69, presented reissue claim 83 recites the language "a first protonic
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike original patent claim 69, presented reissue claim 83 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 70, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in confact with the first protonic conductive electrolyte membrane." Unlike original patent claim 71, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	83		
Original Patent Claim	70		71.

Presented Reissue Claim		Unlike, original patent claim 72, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 73, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
				· · · · · · · · · · · · · · · · · · ·
Original Patent Claim	72		73	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
74	83	Unlike original patent claim 74, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a
		thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also
		recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the
		language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 74, presented reissue claim 83 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and
		second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."
75	83	
		electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also
		recites the language "said sensing and counter electrodes each having a diameter in the range of approximately
		I mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane."
		Unlike original patent claim 75, presented reissue claim 83 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the sensing and the counter electrodes each
		continuous from the first side to the opposite second side within each of the sensing and counter electrodes."

guage	the language "a first protonic conductive ig and counter electrodes, and having a le language "the sensing electrode and the aductive electrolyte membrane," and also g a diameter in the range of approximately measurement means," and also recites the are the only two electrodes in contact with es not recite the language "quantitative sensing and the counter electrodes each and electronic conducting materials are	the language "a first protonic conductive in and counter electrodes, and having a he language "the sensing electrode and the nductive electrolyte membrane," and also g a diameter in the range of approximately measurement means," and also recites the are the only two electrodes in contact with a not recite the language "quantitative ensing, counter, first pumping, and second it, and wherein the ionic and electronic it esecond side within each of the sensing,
Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 76, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are	Unlike original patent claim 77, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrolyte membrane." Unlike original patent claim 77, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes is second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	83	. 83
Original Patent Claim	76	77

uage		ecites the language "a first protonic	th the sensing and counter electrodes,	to 1 mm," recites the language "the	sides of the first protonic conductive	sensing and counter electrodes each	n, and being electrically connected to	lage "in which the sensing electrode	ict with the first protonic conductive	the sensing electrode and the counter	first protonic conductive electrolyte		arritational contract of attackers	s not recite the fanguage quantitative	n the sensing, counter, and reference	nd wherein the ionic and electronic	posite second side within each of the	
Differences in the Claim Language		Unlike original patent claim 78, presented reissue claim 83 recites the language "a first protonic	conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,	and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the	sensing electrode and the counter electrode being on opposite sides of the first protonic conductive	electrolyte membrane," and also recites the language "said sensing and counter electrodes each	having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to	said electrical measurement means," and also recites the language "in which the sensing electrode	and the counter electrode are the only two electrodes in contact with the first protonic conductive	electrolyte membrane," and also recites the language "in which the sensing electrode and the counter	electrode are the only two electrodes in contact with the first protonic conductive electrolyte	membrane."	Talife entring notons of the 70 mines of desired	Ullinke, original patein ciaim 76, presenteu reissue ciaim 63 does not reche me ianguage quantitative	measurement," and also does not recite the language "wherein the sensing, counter, and reference	electrodes each have a first side opposite a second side, and wherein the ionic and electronic	conducting materials are continuous from the first side to the opposite second side within each of the	sensing, counter, and reference electrodes."
Presented	Reissue Claim	83																
Original	Patent Claim	78																

Original 1 2 2	Presented Reissue Claim 84 84	Unlike original patent claim 1, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte/membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 1, presented reissue claim 84 does not recite the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte/membrane," and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte/membrane," and also recites the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane, whereby the gas is transported away from the counter electrode and counter electrodes." Unlike original patent claim 3, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of file first protonic conductive electrolyte membrane," and also recites the language "the arguage "the protonic conductive electrode being on opposite sides of file first protonic conductive electrolyte membrane," and also recites the language "the arguage "the arguage "the protonic conductive electrolyte membrane applies a DC power across the protonic conductive electrolyte membrane applies a DC power across the proton
4	84	which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 3, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon." Unlike original patent claim 4, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 4, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	84		84	
Original Patent Claim	\$		9	

	electrode electrolyte gas in the	uantitative electrolyte	g electrode electrolyte gas in the	uantitative
Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 84 does not recite the language "quantitative
Presented Deign	84		84	
Original Potent Claim	7		∞ .	

nage		es the language "the sensing electrode first protonic conductive electrolyte ng electrode reacts with the gas in the	not recite the language "quantitative he electrochemical gas sensor is	4 recites the language "the sensing ne first protonic conductive electrolyte ig electrode reacts with the gas in the	s not recite the language "quantitative sin the electrochemical gas sensor is
Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	·84		84	
Original	Patent Claim	6		10	

yage	4 recites the language "the sensing he first protonic conductive electrolyte getrode reacts with the gas in the	s not recite the language "quantitative in the electrochemical gas sensor is	4 recites the language "the sensing to first protonic conductive electrolyte gelectrode reacts with the gas in the	s not recite the language "quantitative in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 11, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	84		84	
Original Patent Claim	=		12	

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91,896) 0	84 recites the language "the sensin the first protonic conductive electroly ing electrode reacts with the gas in the	es not recite the language "quantitative in the sensing and counter electrode electrolyte membrane has a thickness	84 recites the language "the sensin the first protonic conductive electrolyting electrode reacts with the gas in the	es not recite the language "quantitativin the electronic and ionic conductinn-electron mixed conductive materizative of a first and a second electrics
Differences in the Claim Language		Unlike original patent claim 13, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented	Reissue Claim	84		84	
Original	Patent Claim	13		14	

	"the sensing ve electrolyte he gas in the	"quantitative erial for both e with a side rboxylic acid	"the sensing re electrolyte he gas in the	"quantitative and electrical ar of the first m."
guage	84 recites the language the first protonic conductions electrode reacts with the first protonic conductions are successed in the succession of the successio	es not recite the language the proton conductor mat strafluorethylene backbon sulfonic acid group or a ca	84 recites the language the first protonic conductions electrode reacts with the section of the	es not recite the language n one of the first and secc carbon black, and the oth ode is 1-50 wt% of platint
Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	84		84	
Original Patent Claim			16	

ıguage	84 recites the language "the sensing the first protonic conductive electrolyte ing electrode reacts with the gas in the	bes not recite the language "quantitative" one of the first and second electrical carbon black, and the other of the first rode is 1-50 wt% of Ru oxide."	84 recites the language "the sensing the first protonic conductive electrolyte ing electrode reacts with the gas in the	es not recite the language "quantitative the electrochemical gas sensor further nductive pump electrodes each having material, each of said first and second er electrodes and situated on opposite e membrane; means for applying a DC trodes having in electrical connection the membrane; whereby the gas is ns for applying DC power across the extrodes.
Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	84		84	
Original Patent Claim	17		18	

guage	34 recites the language "the sensing the first protonic conductive electrolyte ng electrode reacts with the gas in the	es not recite the language "quantitative in the electronic and ionic conducting carbon."	34 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the	es not recite the language "quantitative in the electronic and ionic conducting hoble metals."
Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	84		84	
Original Patent Claim	19		20	

guage	34 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the	es not recite the language "quantitative in the electronic and ionic conducting conductive metal oxides."	34 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the	es not recite the language "quantitative herein the first and second pumping onic conductive electrolyte membrane
Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	
Original Patent Claim	21		22	

uage	4 recites the language "the sensing he first protonic conductive electrolyte ig electrode reacts with the gas in the	s not recite the language "quantitative in the electronic and ionic conducting on-electron mixed conductive material wt% of a first and a second electrical	4 recites the language "the sensing in first protonic conductive electrolyte ig electrode reacts with the gas in the	s not recite the language "quantitative he proton conductor material for both a tetrafluorethylene backbone with a fa sulfonic acid group or a carboxylic
Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 23, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	84	·	84	
Original Patent Claim	23		24	-

guage	34 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the	ss not recite the language "quantitative tone of the first and second electrical of carbon black, and the other of the umping electrode is 10 to 50 wt% of	4 recites the language "the sensing he first protonic conductive electrolyte gelectrode reacts with the gas in the	s not recite the language "quantitative one of the first and second electrical wt% of carbon black, and the other of id pumping electrode is 10 to 50 wt%
Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	84		84	
Original Patent Claim	25		26	

yaage	4 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the	short recite the language "quantitative the electrochemical gas sensor further is first and second porous mixed ionicelectronic conductive material and an pelectrodes being separate from said sof and in contact with said second ing a DC power across said second ctrodes having in electrical connection econd protonic electrolyte membrane; de when said means for applying DC es a DC power to the first and second	4 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the ss not recite the language "quantitative rein the second protonic conductive luorinated ion-exchange nolymer."	Tagrinated, tott Statumies Postarior
Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 27, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; and second protonic electrolyte membrane; means for applying DC power across said second protonic electrolyte membrane; power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 84 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially commised of a solid perfluorinated ion-exchange nolymer."	מיים יו מיים יו מיים יו מיים יו מיים יו מיים יו מיים ווי
Presented Reissue Claim	84		84	
Original Patent Claim	27		28	

	de and the also recites he sensing	0	conductive ickness in r electrode uage "said and being he sensing	uantitative electrically ver source aid means tween the else power the sensing nembrane ch means d counter
age	language "the sensing electro e electrolyte membrane," and a sence of an applied voltage to	e the language "quantitative protonic conductive electrolyte	le language "a first protonic of the language and having a the counter electrode and the counternane," and also recites the language the language the language "in which the language electrode."	not recite the language "quality counter electrodes having e for applying a DC pulse powical connection therebetween so a alternating the connection be the means for applying a DC putrical measurement means to the rical measurement across the rode is placed when said switter membrane to the sensing an
Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte	Unlike original patent claim 30, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 30, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and switch means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	84		84	
Original Patent Claim	29 ·		30	

al Presented Differences in the Claim Language		Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 32, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes
Original Patent Claim	31		32

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
. 33	84	Unlike original patent claim 33, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 33, presented reissue claim 84 does not recite the language "quantitative
,		measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
	84	Unlike original patent claim 34, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 34, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

esented Differences in the Claim Language inte Claim	Unlike original patent claim 35, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 35, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 36, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adanted to detect CO."
Presented Reissue Claim	88		84
Original Patent Claim	35	z.	36

uage	the the language "a first protonic the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to uage "in which the sensing electrode is not being electrode."	s not recite the language "quantitative electrochemical gas sensor is adapted	ecites the language "a first protonic h the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each n, and being electrically connected to lage "in which the sensing electrode ising electrode."	not recite the language "quantitative in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 37, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 38, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	84		84	
Original Patent Claim	37		38	

ted Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 39, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means" and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 40, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	84		84
Original Patent Claim	39		40

nage	4 recites the language "the sensing he first protonic conductive electrolyte age electrode reacts with the gas in the	s not recite the language "quantitative	4 recites the language "the sensing he first protonic conductive electrolyte ig electrode reacts with the gas in the	s not recite the language "quantitative in the sensing and counter electrodes electrolyte membrane has a thickness
Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 41, presented reissue claim 84 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	
Original Patent Claim	41		42	

Differences in the Claim I and		Unlike original patent claim 43, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 43, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 44, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
		Unlike ori conductive and having sensing ele electrolyte having a di said electri reacts with	Unlike or measuren materials having 10 conductor	Unlike ori conductive and having sensing ele electrolyte having a di said electri reacts with	Unlike orig measureme the sensing chain of pe group."
Presented	Reissue Claim	84		84	
Original	Patent Claim	43		44	

	Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 45, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 46, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 1-50 wt%, of Ru oxide."
	Presented Reissue Claim	84		
	Original Patent Claim	45		

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 84 docs not recite the language "a second protonic conductive electrolyte measurement," and also does not recite the language "a second protonic conductive pump electrodes, each having both an electronic conductive material, each of said first and second purpous mixed ionic-electronic conductive pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said sensing and counter electrode being exposed to a chamber sealed off from the ambient atmosphere; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; and second porous pump electrode being in contact with said sensing electrode by a perforated support structure; means for electrical contact with said sensing electrode and prous pump electrode and said perforated support structure; means for electrical from said second protonic electrolyte membrane in electrical contact with said sensing electrode and protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said electrical contact electrode whereby, i
Presented Reissue Claim	84
Original Patent Claim	

guage	34 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the	es not recite the language "quantitative	34 recites the language "the sensing he first protonic conductive electrolyte ng electrode reacts with the gas in the	es not recite the language "quantitative sin the sensing and electrodes have a yte membrane has a thickness of about
Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 48, presented reissue claim 84 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	
Original Patent Claim	48		49	

ed Differences in the Claim Language		Unlike original patent claim 50, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 50, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 51, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid groun or a carboxylic acid
Presented	Reissue Claim	8		84	
Original	Patent Claim	90		51	

Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 52, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt%, of platinum."	Unlike original patent claim 53, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 53, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	84		84	·
Original Patent Claim	52		53	

nage	recites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to quage "in which the sensing electrode ansing electrode."	es not recite the language "quantitative zin the electrochemical gas sensor is	th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to uage "in which the sensing electrode insing electrode." s not recite the language "quantitative in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 54, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 55, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim			84
Original Patent Claim	45		

guage	recites the language "a first protonic with the sensing and counter electrodes, m to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each mm, and being electrically connected to guage "in which the sensing electrode sensing electrode."	es not recite the language "quantitative rein the electrochemical gas sensor is	recites the language "a first protonic with the sensing and counter electrodes, in to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each mm, and being electrically connected to guage "in which the sensing electrode ensing electrode." es not recite the language "quantitative ein the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 56, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 57, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	84		84
Original Patent Claim			57

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Presented Reissue Claim 84

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 60, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 61, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Deisens Claim	84		84	
Original Patent Claim	09		61	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
. 64	48	Unlike original patent claim 64, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 64, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
65	84	Unlike original patent claim 65, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 65, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 68, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 69, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	84		
Original Patent Claim	. 89	·	69

uage	tecites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to uage "in which the sensing electrode nsing electrode."	s not recite the language "quantitative n the sensing, counter and reference onductive electrolyte membrane has a	ecites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each n, and being electrically connected to tage "in which the sensing electrode nsing electrode."	s not recite the language "quantitative the electronic and ionic conducting a proton-electron mixed conductive and 50-90 wt% of a first and second
Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 70, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 71, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	84		84	
Original Patent Claim	70		71	

Original	Presented	D:02
Patent Claim	Reissue Claim	Dilierences in the Claim Language
72	84	Unlike original patent claim 72, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 72, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73	84	Unlike original patent claim 73, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 73, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 74, presented reissue claim 84 does not recite the language "quantitative"	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	
Presented Reisene Claim	84		84
Original Patent Claim	74		75

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 76, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 77, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	84			
Original Patent Claim	76		77	

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Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	. 85	Unlike original patent claim 1, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 1, presented reissue claim 85 does not recite the language "quantitative measurement."
2	82	Unlike original patent claim 2, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 2, presented reissue claim 85 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical
		measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
E.	85	Unlike original patent claim 3, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 3, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	85	Unlike original patent claim 4, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 4, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Original Patent Claim	Presented Peicane Claim	Differences in the Claim Language
5	85	Unlike original patent claim 5 presented reissue claim 85 recites the language 6th ganging classed
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
	· ·	Unlike original patent claim 5, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides,"
9	85	Unlike original natent claim 6 presented reisens claim 85 regits, the lumines (4th, considered decided
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 6, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte
		membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Language	recites the language "the sensing electrode the first protonic conductive electrolyte ensing electrode and the counter electrode iic conductive electrolyte membrane," and reacts with the gas in the absence of an	loes not recite the language "quantitative ein the protonic conductive electrolyte nembrane."	recites the language "the sensing electrode the first protonic conductive electrolyte ensing electrode and the counter electrode iic conductive electrolyte membrane," and reacts with the gas in the absence of an	does not recite the language "quantitative wherein the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	85		85	
Original Patent Claim	7		∞	

uage	as the language "the sensing electrode first protonic conductive electrolyte is electrode and the counter electrode and utility membrane," and its with the gas in the absence of an	not recite the language "quantitative ne electrochemical gas sensor is	recites the language "the sensing le first protonic conductive electrolyte g electrode and the counter electrode and uctive electrolyte membrane," and its with the gas in the absence of an	s not recite the language "quantitative in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	85		88	
Original Patent Claim	6		10	

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Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 11, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissne Claim	82		85	
Original Patent Claim	=		12	

ıguage	85 recites the language "the sensing the first protonic conductive electrolyte ing electrode and the counter electrode conductive electrolyte membrane," and acts with the gas in the absence of an	ses not recite the language "quantitative ein the sensing and counter electrodes e electrolyte membrane has a thickness	85 recites the language "the sensing the first protonic conductive electrolyte ing electrode and the counter electrode conductive electrolyte membrane," and acts with the gas in the absence of an	hes not recite the language "quantitative in the electronic and ionic conducting on-electron mixed conductive material wt% of a first and a second electrical
Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	85		85	
Original Patent Claim			14	

Differences in the Claim Language		Unlike original patent claim 15, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented	Reissue Claim	82		85	
Original	Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt%, of Ru oxide."	Unlike original patent claim 18, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Differe	Unlike original patent claim 17, prese electrode and the counter electrode being membrane," and also recites the languag are the only two electrodes in contact will also recites the language "in which the applied voltage to the sensing electrode."	Unlike original patent claim 17, presente measurement," and also does not recite t conductor materials for the counter elect and second electrical conductor material	Unlike original patent claim 18, prese electrode and the counter electrode being membrane," and also recites the languag are the only two electrodes in contact wi also recites the language "in which the applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 85 does not recite the measurement," and also does not recite the language "wherein the electrocher comprises: first and second porous mixed ionic-electronic conductive pump both an electronic conductive material and an ionic conductive material, each pump electrodes being separate from said sensing and counter electrodes ar sides of and in contact with said protonic conductive electrolyte membrane; mpower across the membrane; said first and second pump electrodes having it therebetween said means for applying DC power across the membrane; transported away from the counter electrode when said means for applying membrane applies a DC power to the first and second pump electrodes."
Presented Reissne Claim	85		85	
Original Patent Claim	17		18	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	85		88	
Original Patent Claim	19		20	

guage	Tecites the language "the sensing he first protonic conductive electrolyte is electrode and the counter electrode onductive electrolyte membrane," and cts with the gas in the absence of an	s not recite the language "quantitative he electronic and ionic conducting onductive metal oxides."	S recites the language "the sensing he first protonic conductive electrolyte and the counter electrode onductive electrolyte membrane," and cts with the gas in the absence of an	s not recite the language "quantitative erein the first and second pumping onic conductive electrolyte membrane
Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	85		85	
Original Patent Claim	21		22	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
23	85	Unlike original patent claim 23, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 23, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
24	85	Unlike original patent claim 24, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 24, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

uage	5 recites the language "the sensing ne first protonic conductive electrolyte gelectrode and the counter electrode onductive electrolyte membrane," and its with the gas in the absence of an	s not recite the language "quantitative one of the first and second electrical of carbon black, and the other of the mping electrode is 10 to 50 wt% of	5 recites the language "the sensing in first protonic conductive electrolyte g electrode and the counter electrode inductive electrolyte membrane," and its with the gas in the absence of an	one of the first and second electrical wt% of carbon black, and the other of d pumping electrode is 10 to 50 wt%
Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	85		88	
Original Patent Claim	25		26	

Differences in the Claim Language		Unlike original patent claim 27, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 27, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; membrane; membrane; membrane; across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid merfluorinated ion-exchange polymer."
Presented	Reissue Claim	88		85
Original	Patent Claim	7.7		28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 30, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and switch means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
	Unlike original counter electrod the language "in the first protonic reacts with the g	Unlike original measurement," membrane is a n	Unlike original electrolyte memble the range of appurbeing on oppositions sensing and councelectrically complete electrolyte memble absence of an app	Unlike original measurement," a connected therebacross the memb for applying DC sensing and coun source across the and counter elec moves CO away connects said melectrodes."
Presented Reissue Claim	85		85	
Original Patent Claim	29		30	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
31	85	Unlike original patent claim 31, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
. ,		Unlike original patent claim 31, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
32		Unlike original patent claim 32, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 32, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes
		comprise noble metals."

Original 33 34	Presented Reissue Claim 85	Unlike original patent claim 33, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "sin which the sensing electrode and the counter electrode are the only two electrodes in confact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 33, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 15 mm, are being electrically connected to said electrical measurement means," and also recites the language "said sensing and counter electrodes and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes and the counter electrodes in confact with the sensing electrical measurement means," and also recites the language "said sensing and counter electrodes and the counter electrodes in conductive electrodes in conductive electrodes in conductive electrodes in conductive electrodes and the counter electrodes in conductive language electrodes in conductive language electrodes in conductive language.
	·	electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
	ı	Unlike original patent claim 34, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

anguage	with the sensing and counter electrodes, mm to 1 mm," recites the language "the site sides of the first protonic conductive id sensing and counter electrodes each mm, and being electrically connected to anguage "in which the sensing electrode ontact with the first protonic conductive nich the sensing electrode reacts with the ode."	oes not recite the language "quantitative in the protonic conductive electrolyte embrane."	with the sensing and counter electrodes, mm to 1 mm," recites the language "the ite sides of the first protonic conductive id sensing and counter electrodes each mm, and being electrically connected to inguage "in which the sensing electrode ontact with the first protonic conductive iich the sensing electrode reacts with the ode:" loes not recite the language "quantitative erein the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 35, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 36, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim			85
Original Patent Claim	. 35		36

guage	the language "a first protonic conductive and counter electrodes, and having a le language "the sensing electrode and the ductive electrolyte membrane," and also g a diameter in the range of approximately measurement means," and also recites the rethe only two electrodes in contact with ites the language "in which the sensing the sensing electrode," and also recites the sensing electrode," and also recites the sensing electrode," and also recites the sensing electrode, "and also recites the sensing electrode," and electrode," and electrode electrode, and electrode electrode, and electrode ele	chemical gas sensor is adapted to detect	the language "a first protonic conductive g and counter electrodes, and having a le language "the sensing electrode and the ductive electrolyte membrane," and also a diameter in the range of approximately measurement means," and also recites the let only two electrodes in contact with ites the language "in which the sensing he sensing electrode," and also recites the sensing electrode," and also recites the sensing electrode, and also recites the sensing electrode, and also recites the sensing and recite the language "quantitative electrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 37, presented reissue claim 85 does not recite the language "quantitative	measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrodyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 38, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	85		88
Original Patent Claim	37		%

ıage	recites the language "the sensing e first protonic conductive electrolyte g electrode and the counter electrode nductive electrolyte membrane," and is with the gas in the absence of an	not recite the language "quantitative	recites the language "the sensing e first protonic conductive electrolyte g electrode and the counter electrode nductive electrolyte membrane," and is with the gas in the absence of an	not recite the language "quantitative the sensing and counter electrodes electrolyte membrane has a thickness
Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 41, presented reissue claim 85 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	85		88	
Original Patent Claim	41		42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 43, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor material."	Unlike original patent claim 44, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 44, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorelhylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
	Unl elec cou reci reci lang	Unl mea said prot	Unli elec thick coun recit 1 m lang the elec elec Unli mea sens
Presented Reissue Claim			85
Original Patent Claim	43		44

Original Patent Claim	Presented Reissne Claim	Differences in the Claim Language
45	88	Unlike original patent claim 45, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 45, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platimum."
46	85	Unlike original patent claim 46, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrodes being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 46, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Original	Presented	Differences in the Claim I and age
Patent Claim	Reissue Claim	
47	88	Unlike original patent claim 47, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes in said electrical characteristic."

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 48, presented reissue claim 85 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane, and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 17 mm."
Presented Reissue Claim	85		85	
Original Patent Claim	48		49	

Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 50, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 51, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	82		85
Original Patent Claim	50		51

ed Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 52, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 53, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1;50 wt% of Ru oxide."
Presented	. 85		85
Original	52		53

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 54, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 55, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to
Difference	Unlike original patent claim 54, presented reissue claim 85 recites the language "a first electrolyte membrane in between and in contact with the sensing and counter electrolyte membrane of approximately 0.1 mm to 1 mm," recites the language "the sensi counter electrode being on opposite sides of the first protonic conductive electrolyte m recites the language "said sensing and counter electrodes each having a diameter in the ran 1 mm to 15 mm, and being electrically connected to said electrical measurement means," language "in which the sensing electrode and the counter electrode are the only two electrical reference of an applied voltage to the sensing electrode."	Unlike, original patent claim 54, presented measurement," and also does not recite the ladetect CO."	Unlike original patent claim 55, presented reissue claim 85 recites the language "a first electrolyte membrane in between and in contact with the sensing and counter electrolyte manages in the range of approximately 0.1 mm to 1 mm," recites the language "the sensi counter electrode being on opposite sides of the first protonic conductive electrolyte macreites the language "said sensing and counter electrodes each having a diameter in the ran 1 mm to 15 mm, and being electrically connected to said electrical measurement means," language "in which the sensing electrode and the counter electrode are the only two electrone first protonic conductive electrolyte membrane," and also recites the language "in electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 55, presented measurement," and also does not recite the la
Presented Reissue Claim	85		88	
Original Patent Claim	54		55	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	82	Unlike original patent claim 56, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 56, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect $NO_{x.}$ "
57	82	Unlike original patent claim 57, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 57, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

	protonic conductive electrolyte membrane in s in the range of approximately 0.1 mm to 1 pposite sides of the first protonic conductive odes each having a diameter in the range of trement means," and also recites the language in contact with the first protonic conductive acts with the gas in the absence of an applied acts with the gas in the absence of an applied ;e "quantitative measurement," and also does "."	protonic conductive electrolyte membrane in s in the range of approximately 0.1 mm to 1 pposite sides of the first protonic conductive odes each having a diameter in the range of urement means," and also recites the language in contact with the first protonic conductive acts with the gas in the absence of an applied conductive electrolyte membrane, having top with the counter electrode and the reference the sensing electrode; the sensing electrode and the counter electrode; dathe counter electrode; means for applying a ansing electrode and said reference electrode; re applying a protonic rapplying a DC power across said protonic
Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode." Unlike, original patent claim 58, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adanted to detect H.S."	Unlike original patent claim 59, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes; in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes; in contact with the first protonic conductive voltage to the sensing electrode." Unlike original patent claim 59, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conductive membrane being in contact with the sensing electrode; the sensing electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode; the sensing electrode and the counter electrode; means for applying a DC power across said protonic electrical contact between the sensing electrode and the counter electrode; means for applying a BC power across said protonic electrolyte membrane electrodyte membrane electrodyte membrane electrode when the means for applying a DC power across said protonic electrolyte membrane electrolyte
Presented Reissue Claim		85
Original Patent Claim		59

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
09		Unlike original patent claim 60, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 60, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."
	88	Unlike original patent claim 61, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 61, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference
		electrodes comprise noble metals."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	0
,	85	Unlike original patent claim 62, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
	•	Unlike, original patent claim 62, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
63	85	Unlike original patent claim 63, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 63, presented reissue claim 85 does not recite the language "quantitative membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

iage	ecites the language "a first protonic h the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive ensing and counter electrodes each n, and being electrically connected to lage "in which the sensing electrode ct with the first protonic conductive the sensing electrode reacts with the instantial protonic conductive the sensing electrode reacts with the "."	not recite the language "quantitative said sensing, counter and reference	bettes the language "a first protonic h the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive ensing and counter electrodes each 1, and being electrically connected to age "in which the sensing electrode ct with the first protonic conductive the sensing electrode reacts with the 1.
Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 64, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode are the only two electrodes in condact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 65, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim			
Original Patent Claim	4		65

nguage	vith the sensing and counter electrodes, and to 1 mm," recites the language "the sensing and counter electrodes, the sides of the first protonic conductive d sensing and counter electrodes each mm, and being electrically connected to lage "in which the sensing electrode and lact with the first protonic conductive ich the sensing electrode reacts with the de."	oes not recite the language "quantitative erein the electrochemical gas sensor is	recites the language "a first protonic with the sensing and counter electrodes, im to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each mm, and being electrically connected to aguage "in which the sensing electrode ntact with the first protonic conductive ch the sensing electrode reacts with the de."	ses not recite the language "quantitative rein the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means, and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 66, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 67, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	85		85	
Original Patent Claim	99		67	

uage	recites the language "a first protonic th the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to uage "in which the sensing electrode act with the first protonic conductive the sensing electrode reacts with the instance of the sensing electrode reacts with the sensing electrode	s not recite the language "quantitative in the electrochemical gas sensor is	the sensing and counter electrodes, to 1 mm," recites the language "the sides of the first protonic conductive sensing and counter electrodes each m, and being electrically connected to tage "in which the sensing electrode out with the first protonic conductive it the sensing electrode reacts with the "". In the electrochemical gas sensor is in the electrochemical gas sensor is
Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 68, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H,S."	
Presented Reissue Claim	82		\$8
Original Patent Claim	89		69

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 70, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 71, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor materials."
Presented Reissue Claim	88		88
Original Patent Claim	70		7.1

Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 72, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid groun or a carboxylic acid groun,"	Unlike original patent claim 73, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 73, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	85	•	88
Original Patent Claim	72		73

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 74, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt%, of Provide."	Unlike original patent claim 75, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 75, presented reissue claim 85 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim			85
Original Patent Claim	74		75

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	5
78	85	
		_
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
0		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language "in which the sensing electrode and the counter
		electrode are the only two electrodes in contact with the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode reacts with the gas in the
		absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 78, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the sensing, counter, and reference
		electrodes each have a first side opposite a second side, and wherein the ionic and electronic
		conducting materials are continuous from the first side to the opposite second side within each of the
		sensing, counter, and reference electrodes."

uage	recites the language "a non-biased vient atmosphere," and also recites the in said electrical characteristic in the	not recite the language "quantitative	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	lying DC power across the protonic een the sensing electrode, the counter the protonic conductive electrolyte lection between the sensing electrode to the means for applying DC power the gas is transported away from the ss the protonic conductive electrolyte odes."
Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 1, original reissue claim 86 does not recite the language "quantitative measurement."	Unlike original patent claim 2, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
Presented Reissue Claim	98		98	
Original Patent Claim			7	

Differences in the Claim Language		Unlike original patent claim 3, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 3, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 4, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
		Unlike original patent claim 3 electrochemical gas sensor for m language "said electrical measur absence of any biasing voltage."	Unlike original patent claim 3, measurement," and does not comprise carbon."	Unlike original patent claim 4 electrochemical gas sensor for m language "said electrical measu absence of any biasing voltage."	Unlike original patent claim 4, measurement," and does not comprise noble metals."
Presented	Reissue Claim	98		98	
Original	Patent Claim	m		4	

yuage	recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative said sensing and counter electrodes	recites the language "a non-biased vient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative the protonic conductive electrolyte ion-exchange polymer."
Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 5, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 6, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	98		98	
Original Patent Claim	5		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 7, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 8, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	98		98	
Original Patent Claim	7		∞	

yaage	recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative ectrochemical gas sensor is adapted to	recites the language "a non-biased pient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative ectrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 9, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	98		98	
Original Patent Claim	6 .		10	

uage	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative ectrochemical gas sensor is adapted to	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative ectrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 11, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 12, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	98		98	
Original Patent Claim	11		12	

guage	6 recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	es not recite the language "quantitative sensing and counter electrodes have a yte membrane has a thickness of about	6 recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	es not recite the language "quantitative the electronic and ionic conducting n-electron mixed conductive material wt% of a first and a second electrical
Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 13, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 14, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	98		98	
Original Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 15, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 16, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	98		98	
Original Patent Claim	15		16	

yuage	recites the language "a non-biased pient atmosphere," and also recites the in said electrical characteristic in the	ss not recite the language "quantitative me of the first and second electrical carbon black, and the other of the first ode is 1-50 wt% of Ru oxide."	recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative ie electrochemical gas sensor further ductive pump electrodes each having material, each of said first and second relectrodes and situated on opposite membrane; means for applying a DC rodes having in electrical connection the membrane; whereby the gas is is for applying DC power across the ctrodes."
Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	98		98	
Original Patent Claim	17		18	

упаде	recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	ss not recite the language "quantitative the electronic and ionic conducting arbon."	recites the language "a non-biased pient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative the electronic and ionic conducting oble metals."
Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 19, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 20, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	98		98	
Original Patent Claim	19		20	

uage	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative the electronic and ionic conducting onductive metal oxides."	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	is not recite the language "quantitative first and second pumping electrodes ductive electrolyte membrane has a
Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 21, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 22, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	98		98	
Original Patent Claim	21		22	

guage	recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	es not recite the language "quantitative the electronic and ionic conducting on-electron mixed conductive material wt% of a first and a second electrical	recites the language "a non-biased bient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative proton conductor material for both the strafluorethylene backbone with a side ulfonic acid group or a carboxylic acid
Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 23, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 24, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	98		98	
Original Patent Claim	23		24	

age	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	of the first and second electrical of carbon black, and the other of the mping electrode is 10 to 50 wt% of	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	on the first and second electrical wt% of carbon black, and the other of d pumping electrode is 10 to 50 wt%
Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	98		98	
Original Patent Claim	25		26	

ıage	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the	is not recite the language "quantitative e electrochemical gas sensor further first and second porous mixed ioniclectronic conductive material and an electrodes being separate from said of and in contact with said second trodes having in electrical connection cond protonic electrolyte membrane; e when said means for applying DC is a DC power to the first and second	recites the language "a non-biased ient atmosphere," and also recites the in said electrical characteristic in the not recite the language "quantitative scond protonic conductive electrolyte on-exchange polymer."
Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 27, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 28, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	98		98
Original Patent Claim	. 27	·	28

guage	he language "a non-biased electrochemical also recites the language "said electrical in the absence of any biasing voltage." so not recite the language "quantitative second protonic conductive electrolyte	he language "a non-biased electrochemical also recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and roximately 1 mm to 15 mm, and being also recites the language "said electrical in the absence of any biasing voltage." es not recite the language "quantitative ring a DC pulse power source across the connection therebetween said means for for alternating the connection between the ans to the means for applying a DC pulse the concentration of said gas, said electrical is when said switch means for applying a said whereby said means for applying a side of the gas sensor where the counter applying a DC pulse power source across
Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 29, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte	Unlike original patent claim 30, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 30, presented reissue claim 86 does not recite the language "means for applying a DC pulse power source across the membrane; and counter electrodes having in electrical connection therebetween said means for applying DC pulse power source across the membrane; and switch means for alternating the connection between the sensing and counter electrical measurement means to the means for applying a DC pulse power source across the membrane; whereby, in a positive ambiend concentration of said gas, said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane electrodes."
Presented Reissue Claim	98	86
Original Patent Claim	29	30

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 31, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any brasing voltage."	Unlike original patent claim 31, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 32, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes	
;	Reissu				
Original	Patent Claim	31		32	

yage	mbient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 strodes each having a diameter in the trically connected to said electrical lectrical asing voltage."	s not recite the language "quantitative said sensing and counter electrodes	recites the language "a non-biased mbient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 strodes each having a diameter in the trically connected to said electrical lectrical measurement means detects using voltage." s not recite the language "quantitative the protonic conductive electrolyte ion-exchange polymer."
Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 33, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 34, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	98		98 .
Original Patent Claim	33		34

ynage	be recites the language "a non-biased ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the trically connected to said electrical electrical asing voltage."	s not recite the language "quantitative the protonic conductive electrolyte brane."	in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the trically connected to said electrical lectrical measurement means detects asing voltage."	
Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 35, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 36, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	
Presented Reissue Claim	98		98 .	
Original Patent Claim	35		36	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	0
37	98	Unlike original patent claim 37, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 37, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
38	86	Unlike original patent claim 38, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 38, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

uage	in between and in contact with the range of approximately 0.1 mm to 1 strodes each having a diameter in the trically connected to said electrical lectrical measurement means detects asing voltage."	mbient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 strodes each having a diameter in the trically connected to said electrical lectrical measurement means detects using voltage." s not recite the language "quantitative ectrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 39, presented reissue claim 86 does not recite the language "wherein the electrochemical gas sensor is adanted to measurement," and does not recite the language "wherein the electrochemical gas sensor is adanted to	detect H ₂ O vapor." Unlike original patent claim 40, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	98	98
Original Patent Claim	39	40

	Differences in the Claim Language)	Unlike original patent claim 41, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage,"	Unlike original patent claim 42, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 42, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
	Presented	Reissue Claim	98	98	
	Original	Patent Claim	41	42	
-				 	

uage	e language "a non-biased electrochemical lso recites the language "a first protonic the sensing and counter electrodes, and lso recites the language "said sensing and eximately 1 mm to 15 mm, and being also recites the language "said electrical the absence of any biasing voltage." s not recite the language "quantitative iic and ionic conducting materials of said re material having 10-50 wt% of a proton anductor materials."	e language "a non-biased electrochemical lso recites the language "a first protonic the sensing and counter electrodes, and lso recites the language "said sensing and vximately 1 mm to 15 mm, and being also recites the language "said electrical the absence of any biasing voltage." s not recite the language "quantitative conductor material for both the sensing kbone with a side chain of perfluorinated ylic acid group."
Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 43, presented reissue claim 86 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor materials."	Unlike original patent claim 44, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 44, presented reissue claim 86 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	98	98
Original Patent Claim	43	44

nguage	86 recites the language "a non-biased ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 lectrodes each having a diameter in the ectrically connected to said electrical electrical measurement means detects biasing voltage."	oes not recite the language "quantitative one of the first and second electrical f carbon black, and the other of the first rode is 1-50 wt% of platinum."	86 recites the language "a non-biased a ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ectrodes each having a diameter in the ectrically connected to said electrical electrical measurement means detects siasing voltage." Des not recite the language "wherein one ounter electrode is 50-99 wt% of carbon or materials for the counter electrode is
Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 45, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 46, presented reissue claim 86 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	98		98
Original Patent Claim	45		46

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and dos recites the language "sacond profing voltage." Unlike original patent claim 47, presented reissue claim 86 does not recite the language "a second profine conductive electrodes, each having both an electronic conductive material and an ionic conductive piump electrodes, each having both an electronic conductive material and an ionic conductive electrodes and situated on opposite sides of and in contact with said second protonic electrodes and situated on opposite sides of and in contact with said sensing all electrodes and situated support structure; means for electrode being esparate from said counter electrode and porous pump electrode being in contact with said sensing electrode and porous pump electrode being in contact with said sensing electrode and porous pump electrode being in contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said electrical characteristic.
Presented Reissue Claim	98
Original Patent Claim	

yuage	recites the language "a non-biased pient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative	recites the language "a non-biased vient atmosphere," and also recites the in said electrical characteristic in the	s not recite the language "quantitative ensing and electrodes have a diameter nbrane has a thickness of about 0.17
Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 48, presented reissue claim 86 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 49, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	98		98	
Original Patent Claim	48		49	

uage	te language a non-biased electrochemical lso recites the language "a first protonic the sensing and counter electrodes, and lso recites the language "said sensing and ximately 1 mm to 15 mm, and being also recites the language "said electrical ithe absence of any biasing voltage."	s not recite the language "quantitative nic and ionic conducting materials of said re material having 10-50 wt% of a proton materials."	le language a non-biased electrochemical lso recites the language "a first protonic the sensing and counter electrodes, and lso recites the language "said sensing and eximately 1 mm to 15 mm, and being also recites the language "said electrical ithe absence of any biasing voltage."	s not recite the language "quantitative tonductor material for both the sensing kbone with a side chain of perfluorinated ylic acid group."
Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 50, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 51, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	98		98	
Original Patent Claim	50		51	,

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
52	98	Unlike original patent claim 52, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	·	Unlike original patent claim 52, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
	86	Unlike original patent claim 53, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 53, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
54	98	Unlike original patent claim 54, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 54, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
55	98	Unlike original patent claim 55, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 55, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 56, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
Original Patent Claim	56		57

Differences in the Claim I ammone	Chief chices in the Ciailli Language	Unlike original patent claim 58, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 58, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," in the absence of any biasing voltage."	Unlike original patent claim 59, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode; means for electrical measurement in electrical contact between the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."
		Unlike original patent claim 58, 1 gas sensor for measurement of a conductive electrolyte membrane having a thickness in the range of counter electrodes each having electrically connected to said elemeasurement means detects chang	Unlike original patent claim 58 measurement," and does not recit H ₂ S."	Unlike original patent claim 59, I gas sensor for measurement of a conductive electrolyte membrane having a thickness in the range of counter electrodes each having electrically connected to said elemeasurement means detects chang	Unlike original patent claim 59 measurement," and does not recition bottom sides, said top side of said and the reference electrode, the besensing electrode; means for elect counter electrode; means for appontant between the sensing electrone the reference electrode when the applies a DC power across said concentration of said gas, said electrones.
Presented	Reissue Claim	98		98	•
Original	Patent Claim	88		59	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim))
	98	Unlike original patent claim 60, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 60, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."
61	98	Unlike original patent claim 61, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 61, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
62	98	Unlike original patent claim 62, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 62, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
63	98	Unlike original patent claim 63, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 63, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid perfluorinated ton-exchange rollymer."

yaage	6 recites the language a non-biased ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the trically connected to said electrical lectrical measurement means detects asing voltage."	s not recite the language "quantitative the protonic conductive electrolyte brane."	o recites the language a non-biased imbient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the trically connected to said electrical ectrical measurement means detects asing voltage." s not recite the language "quantitative ectrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 64, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 65, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 65, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	98		98
Original Patent Claim	64		9

ıage	mbient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 trodes each having a diameter in the rically connected to said electrical ectrical measurement means detects sing voltage."	not recite the language "quantitative setrochemical gas sensor is adapted to	recites the language a non-biased mbient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 trodes each having a diameter in the rically connected to said electrical ectrical measurement means detects sing voltage."
Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 66, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	. 98		98
Original Patent Claim	99		67

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
89	98	Unlike original patent claim 68, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 68, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect H ₂ S."
69	98	Unlike original patent claim 69, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any bigsing voltage."
		Unlike original patent claim 69, presented reissue claim 86 does not recite the language "quantitative"
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect H ₂ O vapor."

sented Differences in the Claim Language	+	sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 70, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm*, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 71, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second
Presented Reissne Claim	98	*		98
Original Patent Claim	70			71

W. C.	Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 72, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electricals each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 73, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
	Presented Reissue Claim	98		98
10.10	Original Patent Claim	72		73

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 74, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 75, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	98			
Original Patent Claim			75	

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented reissue claim 86 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes." Unlike original patent claim 77, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 77, presented reissue claim 86 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented	Reissue Claim 86	98	
Original	Patent Claim 76	77	

nted Differences in the Claim Language Claim	Unlike original patent claim 78, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 78, presented reissue claim 86 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim	98	
Original Patent Claim	78	

Original	Presented	Differences in the Claim Landingoe
Patent Claim	Reissue Claim	
	87	Unlike original patent claim 1, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing
		Voltage Unlike original patent claim 1, original reissue claim 87 does not recite the language "quantitative measurement."
2	87	Unlike original patent claim 2, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 2, presented reissue claim 87 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."

uage	recites the language "a non-biased mbient atmosphere," also recites the he only two electrodes in contact with recites the language "said electrical eristic in the absence of any biasing a not recite the language "quantitative said sensing and counter electrodes	recites the language "a non-biased mbient atmosphere," also recites the recites the language "said electrical eristic in the absence of any biasing not recite the language "quantitative said sensing and counter electrodes
Differences in the Claim Language	Unlike original patent claim 3, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 3, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes	Unlike original patent claim 4, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 4, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	87	87
Original Patent Claim	.	4

guage	recites the language "a non-biased ambient atmosphere," also recites the the only two electrodes in contact with o recites the language "said electrical cteristic in the absence of any biasing so not recite the language."	said sensing and counter electrodes	recites the language "a non-biased ambient atmosphere," also recites the the only two electrodes in contact with o recites the language "said electrical cteristic in the absence of any biasing	es not recite the language "quantitative" the protonic conductive electrolyte ion-exchange polymer."
Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 5, presented reissue claim 87 does not recite the language "onantitative"	measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 6, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	<i>L</i> 8		87	
Original Patent Claim	\$	·	9	

Original	Dracented	Differences in the Claim I andioge
Patent Claim	Reissue Claim	
. 7	87	Unlike original patent claim 7, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 7, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
&	87	Unlike original patent claim 8, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 8, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 9, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	87		87	
Original	Patent Claim	6		10	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
, pand	87	Unlike original patent claim 11, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 11, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
12	87	Unlike original patent claim 12, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 12, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

lage	recites the language "a non-biased mbient atmosphere," also recites the le only two electrodes in contact with recites the language "said electrical eristic in the absence of any biasing	s not recite the language "quantitative ensing and counter electrodes have a te membrane has a thickness of about	recites the language "a non-biased mbient atmosphere," also recites the le only two electrodes in contact with recites the language "said electrical eristic in the absence of any biasing	s not recite the language "quantitative the electronic and ionic conducting electron mixed conductive material vt% of a first and a second electrical
Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 13, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 14, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	87			
Original Patent Claim			14	

Original	Presented	Differences in the Claim I and an
Patent Claim	Reissue Claim	
15		Unlike original patent claim 15, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 15, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
16	87	Unlike original patent claim 16, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 16, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

nguage	the language "a non-biased electrochemical e," also recites the language "the sensing contact with the first protonic conductive cal measurement means detects changes in	oes not recite the language "quantitative f the first and second electrical conductor ck, and the other of the first and second of Ru oxide."	the language "a non-biased electrochemical" also recites the language "the sensing contact with the first protonic conductive cal measurement means detects changes in	oes not recite the language "quantitative ctrochemical gas sensor further comprises: electrodes each having both an electronic id first and second pump electrodes being opposite sides of and in contact with said DC power across the membrane; said first etween said means for applying DC power the counter electrode when said means for a first and second pump electrodes."
Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	87			
 Original Patent Claim	17			

Language	m 87 recites the language "a non-biased an ambient atmosphere," also recites the are the only two electrodes in contact with I also recites the language "said electrical naracteristic in the absence of any biasing	7 does not recite the language "quantitative rein the electronic and ionic conducting rise carbon."	m 87 recites the language "a non-biased an ambient atmosphere," also recites the are the only two electrodes in contact with I also recites the language "said electrical naracteristic in the absence of any biasing	7 does not recite the language "quantitative rein the electronic and ionic conducting rise noble metals."
Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 19, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 20, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	.87		87	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 21, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 22, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	87			
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 23, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 24, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
	Unli elect lang the 1 meas volta	Unli mea: mate havii cond	Unli elect lang the f meas	Unlike on measurer first and chain of group."
Presented Reissue Claim			87	
Original Patent Claim	23		24	

uage	recites the language "a non-biased imbient atmosphere," also recites the he only two electrodes in contact with recites the language "said electrical teristic in the absence of any biasing	s not recite the language "quantitative ne of the first and second electrical % of carbon black, and the other of the amping electrode is 10 to 50 wt% of	mbient atmosphere," also recites the he only two electrodes in contact with recites the language "said electrical teristic in the absence of any biasing	s not recite the language "quantitative ne of the first and second electrical wt% of carbon black, and the other of nd pumping electrode is 10 to 50 wt%
Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim			87	
Original Patent Claim	25			

yaage	ie language "a non-biased electrochemical" also recites the language "the sensing contact with the first protonic conductive ode and the counter electrode are the only trolyte membrane," and also recites the lectrical characteristic in the absence of	so not recite the language "quantitative ochemical gas sensor further comprises: a porous mixed ionic-electronic conductive and an ionic conducting material, each of ng and counter electrodes and situated on uctive electrolyte membrane; means for ane; said first and second pump electrodes in BC power across said second protonic is counter electrode when said means for ane applies a DC power to the first and	e language "a non-biased electrochemical also recites the language "said electrical not the absence of any biasing voltage." so not recite the language "quantitative second protonic conductive electrolyte schange polymer."
Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 27, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; said first and second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 28, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim			87
Original Patent Claim	27		28

guage	le language "a non-biased electrochemical also recites the language "the sensing des in contact with the first protonic age "said electrical measurement means biasing voltage."	le language "a non-biased electrochemical also recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and oximately 1 mm to 15 mm, and being so recites the language "the sensing des in contact with the first protonic age "said electrical measurement means biasing voltage." Es not recite the language "quantitative ing a DC pulse power source across the connection therebetween said means for or alternating the connection between the ans to the means for applying a DC pulse concentration of said gas, said electrical concentration of said gas, said electrical concentration said switch means for applying a side of the gas sensor where the counter applying a DC pulse power source across
Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 29, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte electro	Unlike original patent claim 30, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrode are diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 30, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "means for applying a DC pulse power across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying a DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means detects changes in said electrical characteristic when said switch means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	87	87
Original Patent Claim	29	30

nted Differences in the Claim Language Claim	Unlike original patent claim 31, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 32, presented reissue claim 87 does not recite the language "quantitative measurement" and does not recite the language "quantitative"
Presented Reissue Claim	84		84
Original Patent Claim	31		. 35

Dresented Dieg.	Re	87 Unlike original patent claim 33, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 33, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 34, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protein conductive electrolite membrane is
Original	Patent Claim			46	

guage	le language "a non-biased electrochemical also recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and oximately 1 mm to 15 mm, and being ecites the language "the sensing electrode in the first protonic conductive electrolyte urement means detects changes in said	es not recite the language "quantitative nic conductive electrolyte membrane is a	e language "a non-biased electrochemical liso recites the language "a first protonic the sensing and counter electrodes, and liso recites the language "said sensing and oximately 1 mm to 15 mm, and being ecites the language "the sensing electrode h the first protonic conductive electrolyte urement means detects changes in said so not recite the language "quantitative ochemical gas sensor is adapted to detect
Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 35, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodyte membranes in the range of approximately 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 36, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	87		87
Original Patent Claim	35		

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
`	∞	Unlike original patent claim 37, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 37, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
38	87	Unlike original patent claim 38, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 38, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

m Language	al patent claim 39, presented reissue claim 87 recites the language "a non-biased electrochemical or measurement of a gas in an ambient atmosphere," also recites the language "a first protonic lectrolyte membrane in between and in contact with the sensing and counter electrodes, and kness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and rodes each having a diameter in the range of approximately 1 mm to 15 mm, and being onnected to said electrical measurement means," also recites the language "the sensing electrode ter electrode are the only two electrodes in contact with the first protonic conductive electrolyte and also recites the language "said electrical measurement means detects changes in said racteristic in the absence of any biasing voltage."	87 does not recite the language "quantitative e electrochemical gas sensor is adapted to detect	al patent claim 40, presented reissue claim 87 recites the language "a non-biased electrochemical or measurement of a gas in an ambient atmosphere," also recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, and kness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and rodes each having a diameter in the range of approximately 1 mm to 15 mm, and being onnected to said electrical measurement means," also recites the language "the sensing electrode ter electrode are the only two electrodes in contact with the first protonic conductive electrolyte and also recites the language "said electrical measurement means detects changes in said racteristic in the absence of any biasing voltage."	87 does not recite the language "quantitative electrochemical gas sensor is adapted to detect
Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 39, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 40, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	87		87	
Original Patent Claim	39		40	

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uage	recites the language "a non-biased mbient atmosphere," also recites the recites the language "said electrical eristic in the absence of any biasing	not recite the language "quantitative	recites the language "a non-biased mbient atmosphere," also recites the le only two electrodes in contact with recites the language "said electrical eristic in the absence of any biasing	on or recite the language "quantitative ensing and counter electrodes have a te membrane has a thickness of about
Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 41, original reissue claim 87 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 42, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	87		87	
Original Patent Claim	41			

uage	e language "a non-biased electrochemical lso recites the language "a first protonic the sensing and counter electrodes, and lso recites the language "said sensing and ximately 1 mm to 15 mm, and being to recites the language "the sensing les in contact with the first protonic ge "said electrical measurement means niasing voltage."	s not recite the language "quantitative iic and ionic conducting materials of said e material having 10-50 wt% of a proton nductor materials."	s language "a non-biased electrochemical so recites the language "a first protonic the sensing and counter electrodes, and so recites the language "said sensing and ximately 1 mm to 15 mm, and being o recites the language "the sensing es in contact with the first protonic ge "said electrical measurement means iasing voltage." s not recite the language "quantitative conductor material for both the sensing kbone with a side chain of perfluorinated ylic acid group."
Differences in the Claim Language		Unlike original patent claim 43, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 44, presented reissue claim 87 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	87		87
Original Patent Claim	43		44

126		language "a non-biased electrochemical or recites the language "a first protonic e sensing and counter electrodes, and orecites the language "said sensing and imately 1 mm to 15 mm, and being tes the language "the sensing electrode the first protonic conductive electrolyte ament means detects changes in said	not recite the language "quantitative first and second electrical conductor and the other of the first and second latinum."	anguage "a non-biased electrochemical orecites the language "a first protonic e sensing and counter electrodes, and orecites the language "said sensing and imately 1 mm to 15 mm, and being tes the language "the sensing electrode he first protonic conductive electrolyte means detects changes in said	ecite the language "wherein one of the is 50-99 wt% of carbon black, and the er electrode is 1-50 wt% of Ru oxide."
Differences in the Claim Language		Unlike original patent claim 45, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 45, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 46, presented reissue claim 87 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented	Reissue Claim	1 8			
Original	Patent Claim	6		. 46	

n Language	aim 87 recites the language a non-biased n an ambient atmosphere," also recites the brane in between and in contact with the in the range of approximately 0.1 mm to 1 er electrodes each having a diameter in the g electrically connected to said electrical sing electrode and the counter electrode are conductive electrolyte membrane," and also neans detects changes in said electrical	87 does not recite the language "quantitative d protonic conductive electrolyte membrane; live pump electrodes, each having both an naterial, each of said first and second pump electrodes and situated on opposite sides of extrolyte membrane; said first porous pump he ambient atmosphere; said second porous ectrode by a perforated support structure id second porous pump electrode and said ed support structure; means for electrical ode and perforated support structure; means ctrolyte membrane in electrical contact with acture; whereby the gas is transported away g a DC power across said second protonic second protonic electrolyte membrane; and, said electrical measurement means detects
Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 47, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "a second protonic conductive electrolyce membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyce membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyce membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes in said electrical characteristic.
Presented Reissue Claim	87	
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 48, presented reissue claim 87 does not recite the language "quantitative"	Unlike original patent claim 49, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 49, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	87	87
Original Patent Claim	84	49

Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Described the language "wherein the electronic and ionic conducting materials of said sensing and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a first and a second electrical conductor materials." Unlike original patent claim 51, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm², also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 51, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated mononners containing at least one of a sulfonic acid group or a carboxylic acid group."	
Presented Reissue Claim			
Original Patent Claim		51	

guage	7 recites the language a non-biased ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the trically connected to said electrical electrode and the counter electrode are ictive electrolyte membrane," and also detects changes in said electrical	es not recite the language "quantitative ectrochemical gas sensor is adapted to	7 recites the language a non-biased ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the trically connected to said electrical lectrode and the counter electrode are ctive electrolyte membrane," and also detects changes in said electrical sont recite the language "quantitative ectrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 54, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 55, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	87		87
Original Patent Claim	. 54		55

guage	ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the ctrically connected to said electrical electrode and the counter electrode are active electrolyte membrane," and also detects changes in said electrical	es not recite the language "quantitative lectrochemical gas sensor is adapted to	ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the ctrically connected to said electrical electrode and the counter electrode are ictive electrolyte membrane," and also detects changes in said electrical so rot recite the language "quantitative lectrochemical gas sensor is adapted to	
Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 56, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."		detect H ₂ O vapor."
Presented Reissue Claim			8.1	
Original Patent Claim	56		57	

n Language	the language a non-biased electrochemical gas sensor the language "a first protonic conductive electrolyte r electrodes, and having a thickness in the range of sing and counter electrodes each having a diameter in connected to said electrical measurement means," also e are the only two electrodes in contact with the first anguage "said electrical measurement means detects voltage."	recite the language "quantitative measurement," and is adapted to detect H.S."	the language a non-biased electrochemical gas sensor the language "a first protonic conductive electrolyte r electrodes, and having a thickness in the range of sing and counter electrodes each having a diameter in onnected to said electrical measurement means," also e are the only two electrodes in contact with the first inguage "said electrical measurement means detects voltage."	recite the language "quantitative measurement," and abrane, having top and bottom sides, said top side of ter electrode and the reference electrode, the bottom sensing electrode; means for applying a DC power across said sing electrode and said reference electrode; whereby means for applying a DC power across said means for applying a DC power across said protonic rolyte membrane; and whereby, in a positive ambient changes in said electrical characteristic."
Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 58, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."	Unlike original patent claim 59, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 59, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode; means for electrical measurement in electrical contact between the sensing electrode, means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."
Presented Reissue Claim	87		87	
Original Patent Claim	58		59	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
09	87	Unlike original patent claim 60, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 60, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."
	8.7	Unlike original patent claim 61, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 61, presented reissue claim 87 does not recite the language "wherein said sensing count and reference
		electrodes comprise noble metals."

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 62, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the measurement means," also recites the language "the sensing electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 62, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrically connected to said electrical measurement means," also recites the language "the sensing electrically connected to said electrical the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 63, presented reissue claim 87 does not recite the language "quantitative measurement" and does not recite the language "wherein the protonic conductive electrolyte measurement"
Original	Patent Claim	62	1	63

	the language "a first protonic and counter electrodes, and the language "said sensing and l mm to 15 mm, and being inguage "the sensing electrode protonic conductive electrolyte eans detects changes in said	ie the language "quantitative ive electrolyte membrane is a	the language "a first protonic and counter electrodes, and he language "said sensing and mm to 15 mm, and being nguage "the sensing electrode rotonic conductive electrolyte cans detects changes in said e the language "quantitative et the language "quantitative gas sensor is adapted to detect
guage	the language also recites also recites also recites also recites roximately recites the lath the first I surement m	es not reci onic conduct	the language also recites the sensing also recites oximately recites the la recites the la th the first parement months.
Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 64, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 65, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 65, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim			87
Original Patent Claim	64		

Original	Presented	Differences in the Claim I anmage
Patent Claim	Reissue Claim	
99	87	Unlike original patent claim 66, presented reissue claim 87 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
	,	language "a first protonic conductive electrolyte membrane in between and in contact with the
ű.	-	sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," also recites the language "the sensing electrode and the counter electrode are
	ē	the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Table of the second of the sec
		Unlike original patent claim oo, presented reissue claim 8/ does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect NO _x ."
<i>L</i> 9	87	Unlike original patent claim 67, presented reissue claim 87 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		measurement means," also recites the language "the sensing electrode and the counter electrode are
		the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "said electrical measurement means detects changes in said electrical
		Unlike original patent claim 67, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect hydrogen.

guage	7 recites the language a non-biased ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 ctrodes each having a diameter in the strically connected to said electrical electrode and the counter electrode are totive electrolyte membrane," and also detects changes in said electrical	ss not recite the language "quantitative ectrochemical gas sensor is adapted to	7 recites the language a non-biased ambient atmosphere," also recites the in between and in contact with the range of approximately 0.1 mm to 1 strodes each having a diameter in the trically connected to said electrical ectrode and the counter electrode are citive electrolyte membrane," and also detects changes in said electrical s not recite the language "quantitative ectrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 68, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrical orductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented	87		87
Original Patent Claim	89		69

Presented Difference in the Claim I	Reissue Claim	gas sensor for measurement of a gas in an ambient atmosphere," also recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 70, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 71, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing counter and reference electrodes are a motor electron mixed sond with the conducting materials of said sensing counter and reference electrodes are a motor electronic mixed sond with the conducting materials of said sensing counter and reference electrodes are a motor electronic mixed sond with the conducting materials of said sensing counter and reference electrodes are a motor electronic materials.
Drece	Reissue	∞		Ì∞	
Original	Patent Claim	70		71	

Original Patent Claim	Presented Reissne Claim	Differences in the Claim Language
72	87	Unlike original patent claim 72, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
*		Unlike original patent claim 72, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid proun or a carboxylic acid groun."
73		Unlike original patent claim 73, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm,, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 73, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
74	87	Unlike original patent claim 74, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 74, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."
75		Unlike original patent claim 75, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 75, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented reissue claim 87 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 77, presented reissue claim 87 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side to the opposite second wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing counter first pumping and second mumping and second and second mumping
Differen	Unlike original patent claim 76, presented reissue claim 87 regas sensor for measurement of a gas in an ambient atmosph conductive electrolyte membrane in between and in contact having a thickness in the range of approximately 0.1 mm to 1 counter electrodes each having a diameter in the range of electrically connected to said electrical measurement means, and the counter electrode are the only two electrodes in contamembrane," and also recites the language "said electrical electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented rei and the counter electrodes each have a first s conducting materials are continuous from the and counter electrodes."	Unlike original patent claim 77, presented reissue claim 87 recites the language a non-begas sensor for measurement of a gas in an ambient atmosphere," also recites the lang conductive electrolyte membrane in between and in contact with the sensing and cohaving a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language electrically connected to said electrical measurement means," also recites the language and the counter electrode are the only two electrodes in contact with the first protonic membrane," and also recites the language "said electrical measurement means detelectrical characteristic in the absence of any biasing voltage." Unlike original patent claim 77, presented reissue claim 87 does not recite the language counter, first pumping, and second pumping electrodes each have a first side oppositive wherein the ionic and electronic conducting materials are continuous from the first side and electronic counter first numning and second pumping and second
Presented Reissue Claim			8.4
Original Patent Claim	9.2		77

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Differences in the Claim Language		Unlike original patent claim 78, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 78, presented reissue claim 87 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented	Reissue Claim		
Original	Patent Claim	78	

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 1, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 1, original reissue claim 88 does not recite the language "quantitative measurement."	Unlike original patent claim 2, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 2, presented reissue claim 88 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; and electrical connection between the sensing electrode, the counter electrode, and the means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte
Original	Patent Claim			

Claim Language	e claim 88 recites the language "a non-biased gas in an ambient atmosphere," also recites the is to produce a change in electrical characteristic strode in the absence of an applied voltage to the aid electrical measurement means detects changes biasing voltage."	"wherein said sensing and counter electrodes	e claim 88 recites the language "a non-biased gas in an ambient atmosphere," also recites the is to produce a change in electrical characteristic strode in the absence of an applied voltage to the aid electrical measurement means detects changes biasing voltage."	aim 88 does not recite the language "quantitative "wherein said sensing and counter electrodes
Differences in the Claim Language	Unlike original patent claim 3, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 3, presented reissue claim 88 does not recite the language "auantitative	measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 4, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	88		88	
Original Patent Claim	E		4	

uage	recites the language "a non-biased umbient atmosphere," also recites the e a change in electrical characteristic; absence of an applied voltage to the Il measurement means detects changes tage."	said sensing and counter electrodes	recites the language "a non-biased mbient atmosphere," also recites the e a change in electrical characteristic; absence of an applied voltage to the I measurement means detects changes tage."	s not recite the language "quantitative the protonic conductive electrolyte ion-exchange polymer."
Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 5, presented reissue claim 88 does not recite the language "quantitative	measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 6, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	88		88	
Original Patent Claim	S		. 9	

ıage	recites the language "a non-biased mbient atmosphere," also recites the a change in electrical characteristic absence of an applied voltage to the measurement means detects changes age." not recite the language "quantitative the protonic conductive electrolyte rane."	recites the language "a non-biased mbient atmosphere," also recites the a change in electrical characteristic absence of an applied voltage to the measurement means detects changes age." not recite the language "quantitative ectrochemical gas sensor is adapted to
Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 7, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 8, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	888	88
Original Patent Claim	7	∞

Presented Patent Claim Reissue Claim 88 Unlike original patent claim 9, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 9, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ." Unlike original patent claim 10, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "so produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrochemical gas sensor is adapted to measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 10, presented reissue claim 88 does not recite the language "wherein the electrochemical gas sensor is adapted to detect the date the counter electrochemical gas sensor is adapted to detect the language "wherein the electrochemical gas sensor is adapted to detect the language "wherein the electrochemical gas sensor is adapted to detect the language "wherein the electrochemical gas sensor is adapted to detect the language "wherein the electrochemical gas sensor is ad						
Presented Reissue Claim 88	Differences in the Claim Language		ce original patent claim 9, presented reissue claim 88 recites the language "a non-biased rochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the lage "the sensing electrode reacts with the gas to produce a change in electrical characteristic een the sensing electrode and the counter electrode in the absence of an applied voltage to the ng electrode," and also recites the language "said electrical measurement means detects changes id electrical characteristic in the absence of any biasing voltage."	we original patent claim 9, presented reissue claim 88 does not recite the language "quantitative urement," and does not recite the language "wherein the electrochemical gas sensor is adapted to 1.00M_{c}."	ce original patent claim 10, presented reissue claim 88 recites the language "a non-biased rochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the lage "the sensing electrode reacts with the gas to produce a change in electrical characteristic een the sensing electrode and the counter electrode in the absence of an applied voltage to the ng electrode," and also recites the language "said electrical measurement means detects changes delectrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
			Unlik electr langu betwe sensi in sai	Unlik meas detec	Unlik electr langu betwe sensiin sai	Unlik measi detec
Original Patent Claim 9	Presented	Reissue Claim	&		88	
	Original	Patent Claim	6		10	

		"a non-biased lso recites the characteristic voltage to the etects changes	e "quantitative r is adapted to	"a non-biased lso recites the characteristic voltage to the etects changes	e "quantitative r is adapted to
guage		8 recites the language ambient atmosphere," a ce a change in electrical e absence of an applied al measurement means d Itage."	es not recite the language lectrochemical gas senso	8 recites the language ambient atmosphere," a ce a change in electrical e absence of an applied al measurement means ditage."	es not recite the languago lectrochemical gas senso
Differences in the Claim Language		Unlike original patent claim 11, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 11, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 12, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented	Reissue Claim	88		88	
Original	Patent Claim	11		12	

uage	recites the language "a non-biased mbient atmosphere," also recites the e a change in electrical characteristic absence of an applied voltage to the I measurement means detects changes tage."	s not recite the language "quantitative sensing and counter electrodes have a te membrane has a thickness of about	recites the language "a non-biased mbient atmosphere," also recites the a change in electrical characteristic absence of an applied voltage to the measurement means detects changes age."	s not recite the language "quantitative the electronic and ionic conducting electron mixed conductive material vt% of a first and a second electrical
Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 13, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 14, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	88		888	
Original Patent Claim	13		4	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
15	&	Unlike original patent claim 15, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 15, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
16	888	Unlike original patent claim 16, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 16, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

uage	e language "a non-biased electrochemical also recites the language "the sensing eristic between the sensing electrode and sensing electrode," and also recites the electrical characteristic in the absence of	s not recite the language "quantitative he first and second electrical conductor, and the other of the first and second?"	language "a non-biased electrochemical also recites the language "the sensing eristic between the sensing electrode and sensing electrode," and also recites the electrical characteristic in the absence of	s not recite the language "quantitative ochemical gas sensor further comprises: ectrodes each having both an electronic first and second pump electrodes being posite sides of and in contact with said power across the membrane; said first ween said means for applying DC power counter electrode when said means for rst and second pump electrodes."
Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	88		88	
Original Patent Claim	17		81	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 19, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 20, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	88		88	
Original Patent Claim	61		20	

uage	recites the language "a non-biased mbient atmosphere," also recites the e a change in electrical characteristic absence of an applied voltage to the I measurement means detects changes age."	s not recite the language "quantitative the electronic and ionic conducting onductive metal oxides."	recites the language "a non-biased mbient atmosphere," also recites the a change in electrical characteristic absence of an applied voltage to the measurement means detects changes age." In not recite the language "quantitative first and second pumping electrodes iductive electrolyte membrane has a
Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 21, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 22, presented reissue claim 88 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	&		& &
Original Patent Claim	21		

guage	ambient atmosphere," also recites the a change in electrical characteristic absence of an applied voltage to the il measurement means detects changes ltage."	ss not recite the language "quantitative the electronic and ionic conducting on-electron mixed conductive material wt% of a first and a second electrical	recites the language "a non-biased ambient atmosphere," also recites the a change in electrical characteristic absence of an applied voltage to the Il measurement means detects changes tage."	ss not recite the language "quantitative proton conductor material for both the etrafluorethylene backbone with a side ulfonic acid group or a carboxylic acid
Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 23, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 24, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	88	·	88	
Original Patent Claim	23		24	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
25	88	Unlike original patent claim 25, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 25, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."
26	88	Unlike original patent claim 26, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 26, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."

ed Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 27, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second protonic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; said first and second protonic electrolyte membrane said second protonic electrolyte membrane applying DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes." Unlike original patent claim 28, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 28, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	88	88	
Original Patent Claim	27	28	

nage	age "a non-biased electrochemical gas sensor age "the sensing electrode reacts with the gas de and the counter electrode in the absence of a "said electrical measurement means detects"."	he language "quantitative measurement," and ctrolyte membrane is a metal oxide protonic	iage "a non-biased electrochemical gas sensor guage "a first protonic conductive electrolyte odes, and having a thickness in the range of counter electrodes each having a diameter in d to said electrical measurement means," also change in electrical characteristic between the age to the sensing electrode," and also recites electrical characteristic in the absence of any	the language "quantitative measurement," and cross the membrane; said sensing and counter alying DC pulse power across the membrane; and counter electrodes from the electrical across the membrane; whereby, in a positive tects changes in said electrical characteristic sensing and counter electrodes; and whereby oves CO away from a side of the gas sensor means for applying a DC pulse power source
Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 29, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 30, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane for applying a DC pulse power source across the membrane for applying a DC pulse power source across the membrane for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	88		88	
Original Patent Claim	29		.30	

guage	le language "a non-biased electrochemical also recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and oximately 1 mm to 15 mm, and being ecites the language "the sensing electrode c between the sensing electrode and the electrode," and also recites the language ical characteristic in the absence of any	es not recite the language "quantitative ensing and counter electrodes comprise	e language "a non-biased electrochemical also recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and oximately 1 mm to 15 mm, and being ecites the language "the sensing electrode c between the sensing electrode and the electrode," and also recites the language ical characteristic in the absence of any and recite the language "quantitative in the absence of any and counter electrodes comprise noble
Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 31, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 32, presented reissue claim 88 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	88		88
Original Patent Claim	31		32

Original	Presented	Differences in the Claim Landingoe
Patent Claim	Reissue Claim	
. 33	&	Unlike original patent claim 33, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 33, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34	888	Unlike original patent claim 34, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 34, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

laim Language	in patent claim 37, presented reissue claim 88 recites the language "a non-biased electrochemical for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, and ckness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and ctrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being connected to said electrical measurement means," also recites the language "the sensing electrode the gas to produce a change in electrical characteristic between the sensing electrode and the drode in the absence of an applied voltage to the sensing electrode," and also recites the language in also."	it," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect	nal patent claim 38, presented reissue claim 88 recites the language "a non-biased electrochemical for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, and skness in the range of approximately 1 mm to 15 mm, and being strodes each having a diameter in the range of approximately 1 mm to 15 mm, and being connected to said electrical measurement means," also recites the language "the sensing electrode the gas to produce a change in electrical characteristic between the sensing electrode and the trode in the absence of an applied voltage to the sensing electrode," and also recites the language cal measurement means detects changes in said electrical characteristic in the absence of any ige." linal patent claim 38, presented reissue claim 88 does not recite the language "quantitative t," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect t," and does recite the language "wherein the electrochemical gas sensor is adapted to detect
Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."	measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	
Presented Reissue Claim	888		
Original Patent Claim	37		

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	88	Unlike original patent claim 39, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 39, presented reissue claim 88does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
40	8	Unlike original patent claim 40, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 88does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."

n Langilage	28770	aim 88recites the language "a non-biased in an ambient atmosphere," also recites the produce a change in electrical characteristic; in the absence of an applied voltage to the rical measurement means detects changes in y voltage."	88does not recite the language "quantitative	aim 88recites the language "a non-biased in an ambient atmosphere," also recites the produce a change in electrical characteristic; in the absence of an applied voltage to the rical measurement means detects changes in yoltage." 88does not recite the language "quantitative in the sensing and counter electrodes have a ectrolyte membrane has a thickness of about
Differences in the Claim Language		Unlike original patent claim 41, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 41, original reissue claim 88does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 42, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	88		88
Original	Patent Claim	41		42

uage	age "a non-biased electrochemical gas sensor page "a first protonic conductive electrolyte odes, and having a thickness in the range of counter electrodes each having a diameter in 1 to said electrical measurement means," also hange in electrical characteristic between the age to the sensing electrode," and also recites lectrical characteristic in the absence of any	he language "quantitative measurement," and iterials of said sensing and counter electrodes of on conductor material and 50-90 wt% of a	age "a non-biased electrochemical gas sensor uage "a first protonic conductive electrolyte des, and having a thickness in the range of counter electrodes each having a diameter in I to said electrical measurement means," also hange in electrical characteristic between the ige to the sensing electrode," and also recites lectrical characteristic in the absence of any	ne language "quantitative measurement," and ooth the sensing and counter electrodes is a inated monomers containing at least one of a
Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 43, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 44, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	88		88	
Original Patent Claim	43		44	

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 45, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	88		88	
Original Patent Claim	45		46	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
47	888	Unlike original patent claim 47, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 47, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode when the means for applying a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

Claim Language	e claim 88 recites the language "a non-biase gas in an ambient atmosphere," also recites the to produce a change in electrical characteristicade in the absence of an applied voltage to the id electrical measurement means detects change biasing voltage."	nal patent claim 49, presented reissue claim 88 recites the language "a non-biased ical gas sensor for measurement of a gas in an ambient atmosphere," also recites the sensing electrode reacts with the gas to produce a change in electrical characteristic sensing electrode and the counter electrode in the absence of an applied voltage to the trode," and also recites the language "said electrical measurement means detects changes ical characteristic in the absence of any biasing voltage." nal patent claim 49, presented reissue claim 88 does not recite the language "quantitative t," and does not recite the language "wherein the sensing and electrodes have a diameter mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17
Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 48, presented reissue claim 88 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 49, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	88	88
Original Patent Claim		

Original	Presented	Differences in the Claim Landingoe
Patent Claim	Reissue Claim	
20	88	Unlike original patent claim 50, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 50, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
51	88	Unlike original patent claim 51, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 51, presented reissue claim 88 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
52	88	Unlike original patent claim 52, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and
		having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being
		reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an annied voltage to the sensing electrode in the absence of an annied voltage to the sensing electrode.
		"said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 52, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second
		electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
53	& &	Unlike original patent claim 53, presented reissue claim 88 recites the language a non-biased electrochemical
		having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and
		counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being
		electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the case to produce a chance in electrical characteristic hermon the consing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode." and also recites the language
		"said electrical measurement means detects changes in said electrical characteristic in the absence of any
		biasing voltage."
		Unlike original patent claim 53, presented reissue claim 88 does not recite the language "quantitative
	,	measurement," and does not recite the language "wherein one of the first and second electrical conductor
14		materials for the counter electrode is 20-99 Wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1.50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 54, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 55, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Differences in the	Unlike original patent claim 54, presented reissue clain gas sensor for measurement of a gas in an ambient a conductive electrolyte membrane in between and in having a thickness in the range of approximately 0.1 m counter electrodes each having a diameter in the rielectrically connected to said electrical measurement in reacts with the gas to produce a change in electrical counter electrode in the absence of an applied voltage "said electrical measurement means detects changes biasing voltage."	Unlike original patent claim 54, presented reissue measurement," and does not recite the language "when CO."	Unlike original patent claim 55, presented reissue clain gas sensor for measurement of a gas in an ambient a conductive electrolyte membrane in between and in having a thickness in the range of approximately 0.1 mm counter electrodes each having a diameter in the ralectrically connected to said electrical measurement in reacts with the gas to produce a change in electrical counter electrode in the absence of an applied voltage "said electrical measurement means detects changes biasing voltage." Unlike original patent claim 55, presented reissue measurement," and does not recite the language "when hydrogen."
Presented Reissue Claim	88		88
Original Patent Claim	54		

uage	he language a non-biased electrochemical lso recites the language "a first protonic the sensing and counter electrodes, and lso recites the language "said sensing and ximately 1 mm to 15 mm, and being exites the language "the sensing electrode between the sensing electrode and the electrode," and also recites the language call characteristic in the absence of any	s not recite the language "quantitative ochemical gas sensor is adapted to detect	te language a non-biased electrochemical lso recites the language "a first protonic the sensing and counter electrodes, and lso recites the language "said sensing and eximately 1 mm to 15 mm, and being exites the language "the sensing electrode is between the sensing electrode and the electrode," and also recites the language cal characteristic in the absence of any so not recite the language "quantitative ochemical gas sensor is adapted to detect
Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 56, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes. The range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	88		88
Original Patent Claim	95		57

Claim Language	nal patent claim 58, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor ment of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte n between and in contact with the sensing and counter electrodes, and having a thickness in the range of ly 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also neguage "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the rode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites "said electrical measurement means detects changes in said electrical characteristic in the absence of any ge." In a patent claim 58, presented reissue claim 88 does not recite the language "quantitative measurement," and te the language "wherein the electrochemical cas sensor is adapted to detect H.S."	al patent claim 59, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor ment of a gas in an ambient atmosphere," also recites the language a non-biased electrochemical gas sensor nest of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte in between and in contact with the sensing and counter electrodes each having a diameter in approximately 1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means, also negres "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the rode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites "said electrical measurement means detects changes in said electrical characteristic in the absence of any ge." all patent claim 59, presented reissue claim 88 does not recite the language "quantitative measurement," and ite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of a contact between the sensing electrode and the counter electrode, means for electrical measurement contact between the sensing electrode, means for applying a DC power across said protonic lembrane applies a DC power across said protonic electrolyte membrane; and whereby, in a positive ambient and said electrical measurement means detects changes in said electrical characteristic."
Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 58, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."	Unlike original patent claim 59, presented reissue claims greates the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 59, presented reissue claim 88 does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said reference electrode, the bottom side of said protonic conductive membrane being in contact with the means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a pc electrical measurement means detects changes in sai
Presented Reissue Claim	88	88
Original Patent Claim	58	

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 62, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 63, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is	substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim			88	
Original Patent Claim	7		63	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	88	Unlike original patent claim 64, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 64, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
65	88	Unlike original patent claim 65, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

	uage Tage	he language a non-biased electrochemical liso recites the language "a first protonic the sensing and counter electrodes, and liso recites the language "said sensing and oximately 1 mm to 15 mm, and being exites the language "the sensing electrode to between the sensing electrode and the electrode," and also recites the language ical characteristic in the absence of any	ss not recite the language "quantitative ochemical gas sensor is adapted to detect	he language a non-biased electrochemical liso recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and oximately 1 mm to 15 mm, and being ecites the language "the sensing electrode between the sensing electrode and the electrode," and also recites the language ical characteristic in the absence of any senot recite the language "quantitative ochemical gas sensor is adapted to detect
Differenced in the Claim I am	Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 66, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _{x."}	Unlike original patent claim 67, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Drogontod	Reissue Claim	88	:	88
Lowing	Patent Claim	99		

laim Language	inal patent claim 68, presented reissue claim 88 recites the language a non-biased electrochemical for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, and ckness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and ctrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being connected to said electrical measurement means," also recites the language "the sensing electrode the gas to produce a change in electrical characteristic between the sensing electrode and the ctrode in the absence of an applied voltage to the sensing electrode," and also recites the language ical measurement means detects changes in said electrical characteristic in the absence of any age."	im 88 does not recite the language "quantitative the electrochemical gas sensor is adapted to detect	inal patent claim 69, presented reissue claim 88 recites the language a non-biased electrochemical for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic electrolyte membrane in between and in contact with the sensing and counter electrodes, and ckness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and ctrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being connected to said electrical measurement means," also recites the language "the sensing electrode the gas to produce a change in electrical characteristic between the sensing electrode and the strode in the absence of an applied voltage to the sensing electrode," and also recites the language itself measurement means detects changes in said electrical characteristic in the absence of any age." age." ginal patent claim 69, presented reissue claim 88 does not recite the language "quantitative in," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect in,"
Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 68, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	origins original original origins original origins original origins original origins original origins original
Presented Reissue Claim			88
Original Patent Claim			69

uage	he language a non-biased electrochemical liso recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and oximately 1 mm to 15 mm, and being ecites the language "the sensing electrode c between the sensing electrode and the cyclectrode," and also recites the language ical characteristic in the absence of any so not recite the language "quantitative s, counter and reference electrodes have a membrane has a thickness of about 0.17	he language a non-biased electrochemical also recites the language "a first protonic the sensing and counter electrodes, and also recites the language "said sensing and oximately 1 mm to 15 mm, and being exites the language "the sensing electrode c between the sensing electrode and the relectrode," and also recites the language ical characteristic in the absence of any location and ionic conducting materials of said conductive material having 10-50 wt% lectrical conductor materials."
Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 70, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17	Unlike original patent claim 71, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 71, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor materials."
Presented Reissue Claim	88	88
Original Patent Claim	70	71

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
72 .	8	Unlike original patent claim 72, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 72, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73	88	Unlike original patent claim 73, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 73, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Original Patent Claim 174 775	Reissue Claim 88 88	Differences in the Claim Language Unlike original patent claim 74, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere, also recites the language "as first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and being electrical measurement of a gas in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing all certicals at thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "fast sensing electrode counter electrode in the absence of an applied voltage to the sensing electrode." and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 74, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide. Unlike original patent claim 75, presented reissue claim 88 recites the language "a first protonic conductive electrodes each having a diameter in the range of approximately 1 mm to 1 mm," also recites the language "said sensing alectrical measurement means," also recites the language "said sensing alectrical measurement means," also recites the language "said sensing electrical measurement means," also recites the language "said sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 75, presented reissue claim 88 does not recite the language "quantitative measurement means detects cha
_,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."

Differences in the Claim Language		Unlike original patent claim 76, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented reissue claim 88 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electricals and an assurement means," also recites the language "said sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 77, presented reissue claim 88 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping, and second pumping electrodes."
Presented	Reissue Claim	88		88
Original	Patent Claim	76		77

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee:

Shen et al.

Assignee:

Atwood Mobile Products, Inc.

U.S. Patent No.:

5,573,648

Date Issued: November 12, 1996

Application No.:

381,718

Date Filed:

January 31, 1995

Title:

GAS SENSOR BASED ON PROTONIC CONDUCTIVE

MEMBRANES

Mail Stop Reissue Commissioner for Patents P.O. Box. 1450 Alexandria, VA 22313-1450

REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT

Dear Sir:

This paper is being filed as part of the application for reissue patent based on the original patent captioned above.

Filed herewith this paper is a Certificate under 37 C.F.R. § 3.73(b).

The assignee owning an undivided interest in said original patent is Atwood Mobile Products, Inc. As shown in the attachments to the Certificate under 3.73(b), Atwood Industries, Inc. made a capital contribution of all its assets to Atwood RV Products, Inc. Mobile Products, Inc. Atwood RV Products, Inc. merged with two other companies and subsequently changed its name to Atwood Mobile Products, Inc. Dura Automotive Systems, Inc. is authorized to act on behalf of the assignee. The assignee hereby consents to the accompanying application for reissue.

Dated: 7 July

David Bovee

Vice President

Dura Automotive Systems, Inc.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee:

Shen et al.

Assignee:

Atwood Mobile Products, Inc.

U.S. Patent No.:

5,573,648

Date Issued: November 12, 1996

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MEMBRANES

Mail Stop Reissue Commissioner for Patents P.O. Box. 1450 Alexandria, VA 22313-1450

CERTIFICATE UNDER 37 C.F.R. § 3.73(b)

Dear Sir:

Atwood Mobile Products, Inc., the owner of all right, title and interest to the above-referenced patent, states that it is:

The assignee of the entire, right, title and interest in the patent identified above by virtue of:

- (1) An Assignment from the inventors of the patent application/patent identified above to Atwood Industries, Inc. The assignment was duly recorded in the United States Patent and Trademark Office at Reel 007454, Frame 0737 on January 31, 1995; and
- (2) The documents attached to this Certificate show that Atwood Industries, Inc. made a capital contribution of all its assets to Atwood RV Products, Inc. The documents attached to this Certificate also show that Atwood RV Products, Inc., through a merger and name change, became Atwood Mobile Products, Inc.

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

7 July 2003

Date

David Bovee Vice President

Dura Automotive Systems, Inc.

ATWOOD INDUSTRIES, INC.

WRITTEN CONSENT IN LIEU OF A SPECIAL MEETING OF THE BOARD OF DIRECTORS

The undersigned, being all the directors of Atwood Industries, Inc., an Illinois corporation (the "Corporation"), pursuant to Section 8.45 of the Illinois Business Corporation Act, hereby consent to the adoption of the following resolutions:

Authorization of Capital Contribution to Atwood RV Products, Inc.

WHEREAS, the mobile products business of the Corporation and its affiliates is being reorganized to transfer all related assets into a newly formed corporation called "Atwood RV Products, Inc.", which will be wholly owned by the Corporation;

WHEREAS, the Corporation has received from its parent company, Anderson Industries, Inc., a capital contribution in the form of all real property, buildings, machinery and equipment and inventory located at the Belvedere, Indiana and LaGrange, Indiana facilities;

WHEREAS, the Corporation wishes to transfer such mobile products assets and operations, together with all real property, buildings, machinery and equipment, and equipment located at the Rockford, Illinois, Greenbrier, Tennessee, and Elkhart, Indiana facilities, to its wholly-owned subsidiary, Atwood RV Products, Inc., as a capital contribution;

NOW THEREFORE, BE IT RESOLVED, that the Corporation hereby authorizes a capital contribution to be made to its wholly owned subsidiary, Atwood RV Products, Inc., such capital contribution to be made in the form of all real property, buildings, machinery and equipment and inventory located at the Belvedere, Indiana, LaGrange, Indiana, Rockford, Illinois, Greenbrier, Tennessee and Elkhart, Indiana facilities.

FURTHER RESOLVED, that the President, any Vice President, the Secretary, or any Assistant Secretary (the "Proper Officers") are hereby authorized and directed to take all such further actions and execute and deliver such further documents and instruments as may be necessary or appropriate in order to effectuate the foregoing capital contribution.

IN WITNESS WHEREOF, the undersigned have executed this Consent as of the date set forth below.

David R. Boves

Stephen E.K. Graham

Dated: December 16, 1999

BLOOMFIELD 14707-4 214800

Form BCA-11.25 (Rev. Jan. 1999)	ARTICLES OF M CONSOLIDATION OR		** 6080-419-2
Jesse White Secretary of State Department of Business Services Springfield, IL 62756 Telephone (217) 782-6961 http://www.sos_state.ll.us			This space for use by Secretary of State /99
DO NOT SEND CASH! Remit payment in check or money order, payable to "Secretary of State."	DEC 23 1999	Fi	ing Fee \$ 150, 00
Filing Fee is \$100, but if merger or consolidation involves more than 2 corporations, \$50 for each additional corporation.	JESSE WHITE SECRETARY OF STATE	Ąţ	proved:
1. Names of the corporations p	merge are consuidated are consumer are consumer and consumer are consumer and consumer are consumer are consumer and consumer are consumer are consumer and consumer are consumer and consumer are consumer and consumer are consumer and consumer are consumer are consumer are consumer are consumer are consumer are consu	nd the state or country of t	heir incorporation:
Name of Corpo	oration	State or Country of Incorporation Illinois	Corporation File Number 6020-419-2
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Atwood RV Products, Inc	oration	of Incorporation Illinois	File Number 6/20-419-2
Atwood RV Products, Inc	oration	of Incorporation Illinois Michigan	File Number 6020-419-2 NQ
Atwood RV Products, Inc. Thompson I.G. Corp. Hydro Flame Corporation	oration	of Incorporation Illinois Michigan Utah	File Number 6020-419-2 NQ NQ
Atwood RV Products, Inc. Thompson I.G. Corp. Hydro Flame Corporation Z. The laws of the state or cou	untry under which each corporati	of Incorporation Illinois Michigan Utah On is incorporated permit	File Number 6020-419-2 NQ NQ

If not sufficient space to cover this point, add one or more sheets of this size.

merger
4. Plan of xarophidation: is as follows:

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See Exhibit A attached.

DEC 23 1999
SECRETARY OF STATE

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7. (Complete this item if reporting a merger under § 11.30-	-90% owned subsidiary provisions.) H/A
a. The number of outstanding shares of each class of	each merging subsidiary corporation and the number of such adoption of the plan of merger by the parent corporation, are:
Total Numbe Outsta	er of Shares Number of Shares of Each Class
Name of Corporation of Each	
 b. (Not applicable to 100% owned subsidaries) The date of mailing a copy of the plan of merger and n subsidiary corporation was 	otice of the right to dissent to the shareholders of each merging
(Month & Day)	(Year)
was written consent for the merger or written waiver of all subsidiary corporations received?	f the 30-day period by the holders of all the outstanding shares Yes No
the shareholders of each merging subsidiary corpor	to he signed by their different and are
Dated December 16 1999	4am 1 3 m 0
Dated <u>December</u> (6 1999 (1999) (Year)	Atwood RY Products, Inc. (Fxact Name of Corporation)
	(Flacilyanies) Corporation)
Signature of Secretary or Assistant Secretary)	by All
	(Signature of President or Vice President)
(Type or Print Name and Title)	David R. Bovee, President
Tit Danner 1/	(Type or Print Name and Title)
(Month & Day) (Year)	Thompson I.G.) Corp. (Exact/Name/of Corporation)
attested by	by
(Signature of Secretary or Posistant Secretary)	(Signature of President or Vice President)
Yohn A. Krsul, Jr., Secretary (Type or Print Name and Tille)	David R. Bovee, President
	(Type or Print Name and Title)
Dated December 1(p 1999 (Month & Day) (Year)	Hydro Flame Corporation
~ 0 a \sqrt{L}	. (Exact the fit Corporation)
(Signature of Secretary)	(Signature of President or Vice President)
C-195.8 (Type or Print Name and Tille)	David R. Bovee, President (Type or Print Name and Title)

SUBMIT

2000-09-22 11:01:10

Cook | County Recorder

27.50

Form BCA-10.30

ARTICLES OF AMENDMENT

File #



(Rev.: Jan. 1999)

Jessa White Secretary of State Department of Business Services Springfield, IL 62756 Telephone (217) 782-1832

Remit payment in check or money order, payable to "Secretary of State."

The filing fee for restated articles of amendment - \$100.00

http://www.sos.state.ll.us

AUG 25 2000

JESSE WHITE SECRETARY OF STATE This space for use by Secretary of State

Date 8-25-00

Franchise Tax

Filing Fee* Penalty

\$25.00

Approved:

_			
7,	•	CORPORATE	NAME
٠,		CORPORATE	NAM

Atwood RV Products, Inc.

have not consented in writing have been given notice in accordance with Section 7.10;

(Note 1)

MANNER OF ADOPT	ION OF AMENDMENT
-----------------	------------------

	"" ADOP HON OF AMENDMENT:	•
	The following amendment of the Articles of Incorporation was adopted onAugust 15	
$\dot{\Box}$	(Year) in the manner indicated below. ("X" one box only)	•
٠	By a majority of the incorporators, provided no directors were named in the articles of incorporation an have been elected;	d no directors
	By a majority of the board of disease	(Note 2)
	By a majority of the board of directors, in accordance with Section 10.10, the corporation having issues of the time of adoption of this amendment;	eci no shares
	By a majority of the board of directors in accordance with D. II	(Note 2)
. ·	By a majority of the board of directors, in accordance with Section 10.15, shares having been issued but action not being required for the adoption of the amendment;	t shareholder
X	By the shareholders, in accordance with Souther 42 co	(Nots 3)
	By the shareholders, in accordance with Section 10.20, a resolution of the board of directors having adopted and submitted to the shareholders. At a meeting of shareholders, not less than the minimulation votes required by statute and by the articles of incorporation were voted in favor of the amendment.	ng been duly m number of
	By the shareholders, in accordance with Sections 10.00 and 7.10	(Note 4)
	duly adopted and submitted to the shareholders. A consent in writing has been signed by shareholders than the minimum number of votes required by stantage and by the additional stantage and the stantage an	having been s having not
	less than the minimum number of votes required by statute and by the articles of incorporation. Share not consented in writing have been given notice in accordance with Species 7.40.	holders who

duly adopted and submitted to the shareholders. A consent in writing has been signed by all the shareholders entitled to vote on this amendment. TEXT OF AMENDMENT:

(Notes 4 & 5).

When amendment effects a name change, insert the new corporate name below. Use Page 2 for all other

Article I: The name of the corporation is:

Atwood Mobile Products, Inc.

By the shareholders, in accordance with Sections 10.20 and 7.10, a resolution of the board of directors having been

(NEW NAME)

All changes other than name, Include

Text of Amendment.

b. (If amendment affects the corporate purpose, the amended purpose is required to be set forth in its entirety. If there is not sufficient space to do so, add one or more sheets of this size.)

00740958 Page 3 of

4.	The manner, if not set forth in Art or a reduction of the number of a provided for or effected by this a	authorized shares of an	ly class below the number of	issued shares of that class
	No change		*	
			, .	· .
5.	(a) The manner, if not set forth in capital (Pald-in capital replaces accounts) is as follows: (If not ap	the terms Stated Capl	tal and Paid-in Surplus and is	nge in the amount of pald-in s equal to the total of these
	No change			
	(b) The amount of paid-in capital to the total of these accounts) as	(Paid-In Capital replace changed by this amen	s the terms Stated Capital and dment is as follows: (If not app	Paid-in Surplus and is equal plicable, insert "No change")
	No change	•		•
	;		Before Amendment	After Amendment
. :		Paid-in Capital	\$	\$
6.	(Complete either Iter The undersigned corporation has cause under penalties of perjury, that the fac	ad this statement to be s	natures must be in <u>BLACK</u> signed by its duly authorized offi	
	Dated August 16	2000	Atwood RV Products	• •
	attested by Augustical	? . (Year)	(Exact Name of Socional by	ation at date of execution)
	(Signature of Secretary or	Assistant Secretary)	(Signature of Preside	ent or Vice President)
	J. Bryan Williams, (Type or Print Nar		David R. Bovee, Pr	esident Vams and Tille)
7.	If amendment is authorized pursuant to or print name and little.	Section 10.10 by the i		·
		OR		
	If amendment is authorized by the directors or such directors as may be	ectors pursuant to Secti designated by the boar	ion 10.10 and there are no offi d, must sign below, and type	cers, then a majority of the or print name and title.
	The undersigned affirms, under the p	enalties of perjury, that	the facts stated herein are tru	e.
	Dated			
	(Month & Day)	. (Year)	•	
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NOTES and INSTRUCTIONS

- NOTE 1: State the true exact corporate name as it appears on the records of the office of the Secretary of State, BEFORE any amendments herein reported.
- NOTE 2: Incorporators are permitted to adopt amendments ONLY before any shares have been issued and before any directors have been named or elected. (§ 10.10)
- NOTE 3: Directors may adopt amendments without shareholder approval in only seven instances, as follows:
 - (a) to remove the names and addresses of directors named in the articles of incorporation:
 - (b) to remove the name and address of the initial registered agent and registered office, provided a statement pursuant to § 5.10 is also filed;
 - (c) to increase, decrease, create or eliminate the par value of the shares of any class, so long as no class or series of shares is adversely affected.
 - (d) to split the issued whole shares and unissued authorized shares by multiplying them by a whole number, so long as no class or series is adversely affected thereby;
 - (e) to change the corporate name by substituting the word "corporation", "incorporated", "company", "limited", or the abbreviation "corp.", "inc.", "co.", or "ltd." for a similar word or abbreviation in the name, or by adding a geographical attribution to the name;
 - (f) to reduce the authorized shares of any class pursuant to a cancellation statement filed in accordance with § 9.05,
 - (g) to restate the articles of incorporation as currently amended.

(§ 10.15)

NOTE 4: All amendments not adopted under § 10.10 or § 10.15 require (1) that the board of directors adopt a resolution satting forth the proposed amendment and (2) that the shareholders approve the amendment.

Shareholder approval may be (1) by vote at a shareholders' meeting (either annual or special) or (2) by consent, in writing, without a meeting.

To be adopted, the amendment must receive the affirmative vote or consent of the holders of at least 2/3 of the outstanding shares entitled to vote on the amendment (but if class voting applies, then also at least a 2/3 vote within each class is required).

The articles of incorporation may supersede the 2/3 vote requirement by specifying any smaller or larger vote requirement not less than a majority of the outstanding shares entitled to vote and not less than a majority within each class when class voting applies.

(§ 10.20)

NOTE 5: When shareholder approval is by consent, all shareholders must be given notice of the proposed amendment at least 5 days before the consent is signed. If the amendment is adopted, shareholders who have not signed the consent must be promptly notified of the passage of the amendment.

(§§ 7.10 & 10.20)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee:

Shen et al.

Assignee:

Atwood Industries, Inc.

U.S. Patent No.:

5,573,648

Date Issued: November 12, 1996

Application No.:

381,718

Date Filed:

January 31, 1995

Title:

GAS SENSOR BASED ON PROTONIC CONDUCTIVE

MEMBRANES

Mail Stop Reissue Commissioner for Patents P.O. Box. 1450 Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT for REISSUE OF U.S. PATENT No. 5,573,648

Dear Sir:

This preliminary amendment is filed herewith a request for reissue application of US Patent No. 5,573,648, a reissue application declaration by the assignee, a statement under 37 C.F.R. 3.73(b), a copy of the specification, figures, abstract and claims and a statement under 37 C.F.R. 1.178(b). Prior to examining the reissue application, please enter the following amendments and remarks. A listing of all claims is provided below for convenient reference.

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AMENDMENTS TO THE CLAIMS

1. (Original) An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:

a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;

a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;

a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

2. (Original) The electrochemical gas sensor as defined in claim 1, further comprising:

means for applying DC power across the protonic conductive electrolyte membrane;

an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and

switch means for alternating an electrical connection between the sensing electrode

and counter electrode from the electrical measurement means to the means for applying

DC power across the protonic conductive electrolyte membrane;

whereby the gas is transported away from the counter electrode when the means for

applying DC power across the protonic conductive electrolyte membrane applies a DC

power to the sensing and counter electrodes.

3. (Original) The electrochemical gas sensor as defined in claim 1, wherein said sensing

and counter electrodes comprise carbon.

4. (Original) The electrochemical gas sensor as defined in claim 1, wherein said sensing

and counter electrodes comprise noble metals.

5. (Original) The electrochemical gas sensor as defined in claim 1, wherein said sensing

and counter electrodes comprise conductive metal oxides.

6. (Original) The electrochemical gas sensor as defined in claim 1, wherein the protonic

conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-

exchange polymer.

7. (Original) The electrochemical gas sensor as defined in claim 1, wherein the protonic

conductive electrolyte membrane is a metal oxide protonic conductor electrolyte

membrane.

8. (Original) The electrochemical gas sensor as defined in claim 1, wherein the

electrochemical gas sensor is adapted to detect CO.

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9. (Original) The electrochemical gas sensor as defined in claim 1, wherein the

electrochemical gas sensor is adapted to detect NO_x.

10. (Original) The electrochemical gas sensor as defined in claim 1, wherein the

electrochemical gas sensor is adapted to detect hydrogen.

11. (Original) The electrochemical gas sensor as defined in claim 1, wherein the

electrochemical gas sensor is adapted to detect H₂S.

12. (Original) The electrochemical gas sensor as defined in claim 1, wherein the

electrochemical gas sensor is adapted to detect H₂O vapor.

13. (Original) The electrochemical gas sensor as defined in claim 1, wherein the sensing

and counter electrodes have a diameter of about 10 mm, and the protonic conductive

electrolyte membrane has a thickness of about 0.17 mm.

14. (Original) The electrochemical gas sensor as defined in claim 1, wherein the electronic

and ionic conducting materials of said sensing and counter electrodes are a proton-electron

mixed conductive material having 10-50 wt% of a proton conductor material and 50-90

wt% of a first and a second electrical conductor materials.

15. (Original) The electrochemical gas sensor as defined in claim 14, wherein the proton

conductor material for both the sensing and counter electrodes is a copolymer having a

tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at

least one of a sulfonic acid group or a carboxylic acid group.

16. (Original) The electrochemical gas sensor as defined in claim 14, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the

sensing electrode is 1-50 wt% of platinum.

17. (Original) The electrochemical gas sensor as defined in claim 14, wherein one of the

first and second electrical conductor materials for the counter electrode is 50-99 wt% of

carbon black, and the other of the first and second electrical conductor materials for the

counter electrode is 1-50 wt% of Ru oxide.

18. (Original) The electrochemical gas sensor as defined in claim 1, wherein the

electrochemical gas sensor further comprises:

first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane;

means for applying a DC power across the membrane;

said first and second pump electrodes having in electrical connection therebetween

said means for applying DC power across the membrane;

whereby the gas is transported away from the counter electrode when said means for

applying DC power across the membrane applies a DC power to the first and second pump

electrodes.

19. (Original) The electrochemical gas sensor of claim 18, wherein the electronic and ionic

conducting materials of the first and second pumping electrodes comprise carbon.

20. (Original) The electrochemical gas sensor as defined in claim 18, wherein the

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electronic and ionic conducting materials of the first and second pumping electrodes

comprise noble metals.

21. (Original) The electrochemical gas sensor as defined in claim 18, wherein the

electronic and ionic conducting materials of the first and second pumping electrodes

comprise conductive metal oxides.

22. (Original) The electrochemical gas sensor as defined in claim 18, wherein the first and

second pumping electrodes have a diameter of about 10 mm, and the first protonic

conductive electrolyte membrane has a thickness of about 0.17 mm.

23. (Original) The electrochemical gas sensor as defined in claim 18, wherein the

electronic and ionic conducting materials of said first and second pumping electrodes are a

proton-electron mixed conductive material having 10-50 wt% of a proton conductor

material and 50-90 wt% of a first and a second electrical conductor materials.

24. (Original) The electrochemical gas sensor as defined in claim 23, wherein the proton

conductor material for both the first and second pumping electrodes is a copolymer having

a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at

least one of a sulfonic acid group or a carboxylic acid group.

25. (Original) The electrochemical gas sensor as defined in claim 23, wherein one of the

first and second electrical conductor materials for the first pumping electrode is 50-99 wt%

of carbon black, and the other of the first and second electrical conductor materials for the

first pumping electrode is 10 to 50 wt% of platinum.

26. (Original) The electrochemical gas sensor as defined in claim 23, wherein one of the

first and second electrical conductor materials for the second pumping electrode is 50-99

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wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide.

27. (Original) The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor further comprises:

a second protonic conductive electrolyte membrane;

first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane;

means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.

- 28. (Original) The electrochemical gas sensor as defined in claim 27, wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.
- 29. (Original)The electrochemical gas sensor as defined in claim 27, wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.
- 30. (Original) An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:

a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;

a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;

a protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement;

means for applying a DC pulse power source across the membrane;

said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and

switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane;

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes.

31. (Original) The electrochemical gas sensor as defined in claim 30, wherein said sensing and counter electrodes comprise carbon.

32. (Original) The electrochemical gas sensor as defined in claim 30, wherein said sensing

and counter electrodes comprise noble metals.

33. (Original) The electrochemical gas sensor as defined in claim 30, wherein said sensing

and counter electrodes comprise conductive metal oxides.

34. (Original) The electrochemical gas sensor as defined in claim 30, wherein the protonic

conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-

exchange polymer.

35. (Original) The electrochemical gas sensor as defined in claim 30, wherein the protonic

conductive electrolyte membrane is a metal oxide protonic conductor electrolyte

membrane.

36. (Original) The electrochemical gas sensor as defined in claim 30, wherein the

electrochemical gas sensor is adapted to detect CO.

37. (Original) The electrochemical gas sensor as defined in claim 30, wherein the

electrochemical gas sensor is adapted to detect hydrogen.

38. (Original) The electrochemical gas sensor as defined in claim 30, wherein the

electrochemical gas sensor is adapted to detect H₂S.

39. (Original) The electrochemical gas sensor as defined in claim 30, wherein the

electrochemical gas sensor is adapted to detect H₂O vapor.

40. (Original) The electrochemical gas sensor as defined in claim 30, wherein the

electrochemical gas sensor is adapted to detect NO_x.

41. (Original) The electrochemical gas sensor as defined in claim 30, wherein the sensing

and counter electrodes have a diameter in a range of 1 mm to 15 mm, and the protonic

conductive electrolyte membrane has a thickness in a range of 0.1 mm-1 mm.

42. (Original) The electrochemical gas sensor as defined in claim 41, wherein the sensing

and counter electrodes have a diameter of about 10 mm, and the protonic conductive

electrolyte membrane has a thickness of about 0.17 mm.

43. (Original) The electrochemical gas sensor as defined in claim 30, wherein the

electronic and ionic conducting materials of said sensing and counter electrodes are a

proton-electron mixed conductive material having 10-50 wt% of a proton conductor

material and 50-90 wt% of a first and a second electrical conductor materials.

44. (Original) The electrochemical gas sensor as defined in claim 43, wherein the proton

conductor material for both the sensing and counter electrodes is a copolymer having a

tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at

least one of a sulfonic acid group or a carboxylic acid group.

45. (Original) The electrochemical gas sensor as defined in claim 43, wherein one of the

first and second electrical conductor materials for the sensing electrode is 50-99 wt% of

carbon black, and the other of the first and second electrical conductor materials for the

sensing electrode is 1-50 wt% of platinum.

46. (Original) The electrochemical gas sensor as defined in claim 43, wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide.

- 47. (Original) An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
- a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material and being exposed to the ambient atmosphere;
- a porous mixed ionic-conductive counter electrode having both an electronic conducting material and an ionic conducting material;
- a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

a second protonic conductive electrolyte membrane;

first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane;

said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere;

said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure;

means for electrical measurement in electrical contact with said sensing electrode and perforated support structure;

means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

- 48. (Original) The electrochemical gas sensor as defined in claim 47, wherein the sensing and counter electrodes have a diameter in a range of 1 mm-15 mm, and the protonic conductive electrolyte membrane has a thickness in a range of 0.1 mm-1 mm.
- 49. (Original) The electrochemical gas sensor as defined in claim 48, wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 50. (Original) The electrochemical gas sensor as defined in claim 47, wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials.
- 51. (Original) The electrochemical gas sensor as defined in claim 50, wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.

52. (Original) The electrochemical gas sensor as defined in claim 50, wherein one of the

first and second electrical conductor materials for the sensing electrode is 50-99 wt% of

carbon black, and the other of the first and second electrical conductor materials for the

sensing electrode is 1-50 wt% of platinum.

53. (Original) The electrochemical gas sensor as defined in claim 50, wherein one of the

first and second electrical conductor materials for the counter electrode is 50-99 wt% of

carbon black, and the other of the first and second electrical conductor materials for the

counter-reference electrode is 1-50 wt% of Ru oxide.

54. (Original) The electrochemical gas sensor as defined in claim 47, wherein the

electrochemical gas sensor is adapted to detect CO.

55. (Original) The electrochemical gas sensor as defined in claim 47, wherein the

electrochemical gas sensor is adapted to detect hydrogen.

56. (Original) The electrochemical gas sensor as defined in claim 47, wherein the

electrochemical gas sensor is adapted to detect NO_x.

57. (Original) The electrochemical gas sensor as defined in claim 47, wherein the

electrochemical gas sensor is adapted to detect H₂O vapor.

58. (Original) The electrochemical gas sensor as defined in claim 47, wherein the

electrochemical gas sensor is adapted to detect H₂S.

59. (Original) An electrochemical gas sensor for quantitative measurement of a gas in an

ambient atmosphere comprising:

a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material and being exposed to the ambient atmosphere;

a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material;

a porous mixed ionic-conductive counter electrode having both an electrical conducting material and an ionic conducting material, and being separate from both said sensing and reference electrodes;

a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement in electrical contact between the sensing electrode and the counter electrode;

means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said reference electrode;

whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane; and

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

60. (Original) The electrochemical gas sensor as defined in claim 59, wherein said sensing, count and reference electrodes comprise carbon.

61. (Original) The electrochemical gas sensor as defined in claim 59, wherein said sensing,

counter and reference electrodes comprise noble metals.

62. (Original) The electrochemical gas sensor as defined in claim 59, wherein said sensing,

counter and reference electrodes comprise conductive metal oxides.

63. (Original) The electrochemical gas sensor as defined in claim 59, wherein the protonic

conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-

exchange polymer.

64. (Original) The electrochemical gas sensor as defined in claim 59, wherein the protonic

conductive electrolyte membrane is a metal oxide protonic conductor electrolyte

membrane.

65. (Original) The electrochemical gas sensor as defined in claim 59, wherein the

electrochemical gas sensor is adapted to detect CO.

66. (Original) The electrochemical gas sensor as defined in claim 59, wherein the

electrochemical gas sensor is adapted to detect NO_x.

67. (Original) The electrochemical gas sensor as defined in claim 59, wherein the

electrochemical gas sensor is adapted to detect hydrogen.

68. (Original) The electrochemical gas sensor as defined in claim 59, wherein the

electrochemical gas sensor is adapted to detect H₂S.

69. (Original) The electrochemical gas sensor as defined in claim 59, wherein the

electrochemical gas sensor is adapted to detect H₂O vapor.

70. (Original) The electrochemical gas sensor as defined in claim 59, wherein the sensing,

counter and reference electrodes have a diameter of about 10 mm, and the protonic

conductive electrolyte membrane has a thickness of about 0.17 mm.

71. (Original) The electrochemical gas sensor as defined in claim 59, wherein the

electronic and ionic conducting materials of said sensing, counter and reference electrodes

are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor

material and 50-90 wt% of a first and second electrical conductor materials.

72. (Original) The electrochemical gas sensor as defined in claim 71, wherein the proton

conductor material for both the sensing, counter and reference electrodes is a copolymer

having a tetrafluorethylene backbone with a side chain of perfluorinated monomers

containing at least one of a sulfonic acid group or a carboxylic acid group.

73. (Original) The electrochemical gas sensor as defined in claim 71, wherein one of the

first and second electrical conductor materials for the sensing electrode is 50-99 wt% of

carbon black, and the other of the first and second electrical conductor materials for the

sensing electrode is 1-50 wt% of platinum.

74. (Original) The electrochemical gas sensor as defined in claim 71, wherein one of the

first and second electrical conductor materials for the counter and reference electrodes is

50-99 wt% of carbon black, and the other of the first and second electrical conductor

materials for the counter and reference electrodes is 1-50 wt% of Ru oxide.

75. (Original) The electrochemical gas sensor as defined in claim 1, wherein the sensing

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and the counter electrodes each have a first side opposite a second side, and wherein the

ionic and electronic conducting materials are continuous from the first side to the opposite

second side within each of the sensing and counter electrodes.

76. (Original) The electrochemical gas sensor as defined in claim 30, wherein the sensing

and the counter electrodes each have a first side opposite a second side, and wherein the

ionic and electronic conducting materials are continuous from the first side to the opposite

second side within each of the sensing and counter electrodes.

77. (Original) The electrochemical gas sensor as defined in claim 47, wherein the sensing,

counter, first pumping, and second pumping electrodes each have a first side opposite a

second side, and wherein the ionic and electronic conducting materials are continuous from

the first side to the opposite second side within each of the sensing, counter, first pumping,

and second pumping electrodes.

78. (Original) The electrochemical gas sensor as defined in claim 59, wherein the sensing,

counter, and reference electrodes each have a first side opposite a second side, and wherein

the ionic and electronic conducting materials are continuous from the first side to the

opposite second side within each of the sensing, counter, and reference electrodes.

Claim 79. (New) A two-electrode electrochemical gas sensor for measurement of a

gas in an ambient atmosphere comprising:

a porous mixed ionic-electronic conductive sensing electrode having both an

electronic conducting material and an ionic conducting material;

a porous mixed ionic-electronic conductive counter electrode having both an

electronic conducting material and an ionic conducting material;

a first protonic conductive electrolyte membrane in between and in contact with the

sensing and counter electrodes, and having a thickness in the range of approximately 0.1

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mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

80. (New) An electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising:

- a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;
- a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;
- a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode;

means for electrical measurement;

said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;

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whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

- Claim 81. (New) A two-electrode electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising:
- a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;
- a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;
- a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode;

means for electrical measurement;

said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

- Claim 82. (New) An electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising:
- a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;

a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;

a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

Claim 83. (New) The electrochemical gas sensor of claim 82 in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane.

Claim 84. (New) The electrochemical gas sensor of claim 82 in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode.

Claim 85. (New) The electrochemical gas sensor of claim 83 in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode.

Claim 86. (New) A non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere comprising:

a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;

a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;

a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage.

Claim 87 (New). The non-biased electrochemical gas sensor of claim 86 in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane.

Claim 88 (New). The non-biased electrochemical gas sensor of claim 86 in which the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode.

REMARKS

I. Status of the Claims

Original claims 1-78 are present in US Patent No. 5,573,648 (the '648 Patent), as originally issued. New claims 79-88 are presented above. Applicants respectfully request examination of claims 1-88.

II. Introduction to the '648 Patent

As discussed in the Reissue Application Declaration by the Assignee, at the time of filing patent application 381,718, which issued as U.S. Patent No. 5,573,648 on November 12, 1996, Applicants failed to claim inventive methods and apparatus disclosed in the specification of the '648 patent. Applicants have filed this reissue application to remedy this error, and Applicants have now directed claims in this Preliminary Amendment to the inventive methods and apparatus disclosed in the original specification filed on January 31, 1995, but not originally claimed.

The claims of the '648 Patent are directed to gas sensors that are operative to sense a gas in an ambient atmosphere. The gas sensors include sensing and counter electrodes each having both an electronic conducting material and an ionic conducting material and a protonic conductive electrolyte membrane between and in contact with the sensing and counter electrodes. Because the sensing and counter electrodes have both an electronic conducting material and an ionic conducting material, gas sensors based on the subject matter of the '648 Patent typically do not require a power source for sensing of the gas.

Thus, the life of any battery used in a commercial sensor covered by the '648 Patent, e.g., a sensor for use as a residential CO sensor, is extended because the battery is only needed to power an alarm.

¹ In the event that the reissue application and the existing reexamination proceeding are merged, new claims 79-88 should be renumbered to be new claims 81-90, respectively.

New claim 79 is similar to original patent claim 1 and also recites that the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane.

New claim 80 is similar to original patent claim 1 and also recites that the sensing electrode reacts with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode.

New claim 81 is similar to original patent claim 1 and also recites that the sensing electrode and the counter electrode are on opposite sides of the first protonic conductive electrolyte membrane, and that the sensing electrode reacts with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode.

New claim 82 is similar to original patent claim 1 and also recites that the sensing electrode and the counter electrode are on opposite sides of the first protonic conductive electrolyte membrane.

New claim 83 depends from new claim 82 and further recites that the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane.

New claim 84 depends from new claim 82 and further recites that the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode.

New claim 85 depends from new claim 83 and further recites that the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode.

New claim 86 is similar to original patent claim 1 and defines a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere. The non-biased electrochemical gas sensor comprises an electrical measurement means that detects changes in an electrical characteristic in the absence of any biasing voltage.

New claim 87 depends from new claim 86 and further recites that the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane.

New claim 88 depends from new claim 86 and further recites that the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode.

III. Support for New Claims 79-88

Support for new claims 79-88 may be found throughout the specification, claims, figures and abstract as originally filed. Support for new claim 79 may be found, for example, at Figure 1, at claim 1 and Col. 5, lines 30-42.

Support for new claim 80 may be found, for example, at claim 1 and Col. 3, lines 35-37.

Support for new claim 81 may be found, for example, at Figure 1, claim 1 and Col. 3, lines 35-37.

Support for new claim 82 may be found, for example, at Figure 1, at claim 1; and Column 7, line 67 to Column 8, line 1.

Support for new claim 83 may be found, for example, at Figure 1, at claim 1 and Col. 5, lines 30-42.

Support for new claim 84 may be found, for example, at Figure 1, at claim 1 and Col. 3, lines 35-37.

Support for new claim 85 may be found, for example, at Figure 1, at claim 1, at Col. 3, lines 35-37, and at Col. 5, lines 30-42.

Support for new claim 86 may be found, for example, at Figure 1, at claim 1, and at Col. 3, lines 35-37.

Support for new claim 87 may be found, for example, at Figure 1, at claim 1, and at Col. 5, lines 30-42.

Support for new claim 88 may be found, for example, at Figure 1, at claim 1, and at Col. 3, lines 35-37.

IV. Conclusion

Each of new claims 79-88 is directed to subject matter that was originally disclosed but never claimed. Applicants request entry of new claims 79-88 and examination of claims 1-88.

Respectfully submitted, Shen et al.

Date: 17 July 2003

Peter D. McDermott (Reg. No. 29,411)

Attorney for Applicants

BANNER & WITCOFF, LTD.

28 State Street, 28th Floor

Boston, MA 02109

Phone: (617) 720-9600

Fax: (617) 720-9601

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patentee:

Shen et al.

Assignee:

Atwood Mobile Products, Inc.

U.S. Patent No.:

5,573,648

Date Issued: November 12, 1996

Application No.:

381,718

Date Filed:

January 31, 1995

Title:

GAS SENSOR BASED ON PROTONIC CONDUCTIVE

MEMBRANES

Mail Stop Reissue Commissioner for Patents P.O. Box. 1450 Alexandria, VA 22313-1450

STATEMENT UNDER 37 C.F.R. § 1.178(b)

Dear Sir:

This statement is being made pursuant to 37 C.F.R. § 1.178(b) to call to the attention of the Patent Office that the above-referenced patent, which is the subject of a reissue application, is currently involved in a reexamination proceeding (Reexamination 90/006,208).

In the reexamination proceeding, each of claims 2, 18-74 and 76-78 of U.S. Patent No. 5,573,648 has been found allowable and each of claims 1, 3-17, 75, 79 and 80 stands finally rejected. Further, in the reexamination proceeding, Applicants presented claims 81-83 (which are presented in the reissue application), but the Examiner refused entry of claims 81-83. Patentee filed an Appeal Brief on April 21, 2003 appealing the decision of the Examiner.

Because this reissue application was filed to claim subject matter that was refused

entry in the reexamination proceeding, the reissue application and the reexamination

proceeding should not be merged and the claims of the reissue application should be

examined.

In addition, because the reissue application will be examined and issue long before

any decision by the Board of Patent Appeals and Interferences in the reexamination

proceeding, the reissue application should not be stayed pending a decision in the

reexamination proceeding.

Therefore, because the Patent Office will issue a final decision on the claims

presented in the reissue application earlier than any final decision will be entered in the

reexamination proceeding, the reissue application should not be merged with the

reexamination proceeding, and the reissue application should not be stayed pending a

decision in the reexamination proceeding.

Respectfully submitted,

Shen et al.

Date: 17 July 2003

Peter D. McDermott (Reg. No. 29,411)

Attorney for Applicants

BANNER & WITCOFF, LTD.

28 State Street, 28th Floor

Boston, MA 02109

Phone: (617) 720-9600

Fax: (617) 720-9601

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